

LINUXUSER

The Linux magazine
for IT decision makers

May-June 2000/£4.95/Issue One

www.linuxuser.co.uk

Launch
Issue!



The rise and rise of Linux

It dominates the Web - could the rest of your business be next?

Free for all

...or is it? Experts discuss
the hidden costs of Linux

You're not alone

We help you pick the best
support and training options

Linux on the desktop

Corel WP Office 2000 takes
on StarOffice and ApplixWare

THE FUTURE'S BRIGHT

THE FUTURE'S ORANGE (AND BLUE WITH A SPLASH OF RED)

The New Alphanet Linux Operating System

features



An MS compatible office productivity suite



A functional 2-D drawing package and vector graphics programme



ODBC-ODBC Bridge provides full access to any local ODBC data source from any remote client



Citrix Metaframe Client provides the foundation for turning any client device into the ultimate thin client



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welcome to the future

www.alphanet-linux.com

LINUXUSER

Issue 1, May-June 2000

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Linux has evolved from humble origins to become the world's most popular Web server and a seriously viable alternative to Microsoft. Jane Lewis traces its progress

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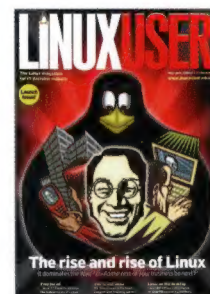
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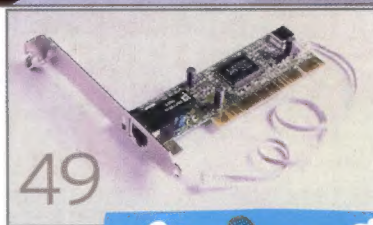
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Our cover illustration, a homage to Linus Torvalds, is the work of the multi-talented Aidan Hughes. See more of his work at www.bruteprop.com



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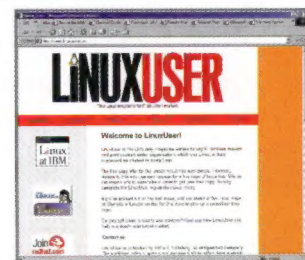
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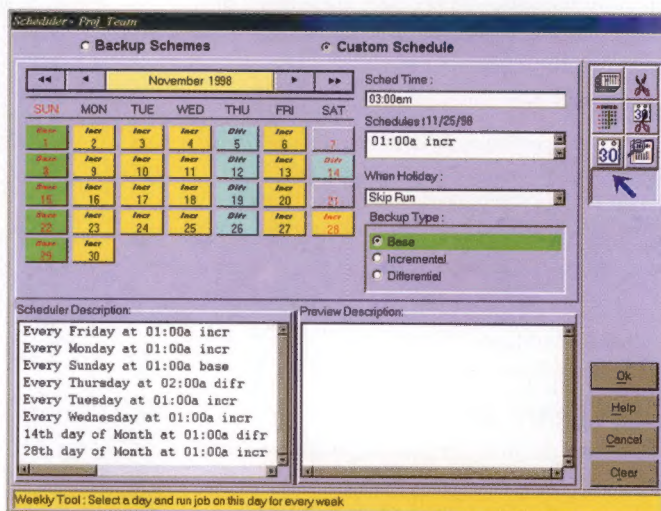
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The Linux magazine for
IT decision makers

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'Freedom's just another word for nothing left to lose,' sang Janis Joplin, and to today's IT decision makers contemplating a deviation off the traditional software map into the uncharted territory of Linux, her words might sound like an appropriate warning.

Even those of us who are already using open source/free software successfully in our work can't blame them for having their doubts. They look with trepidation at a product that depends on what seems like a fragile system of co-operation on the part of thousands of individuals and organisations.

They are concerned at the recent "correction" of the valuations of Linux companies, fearing that they might have inadequate support for any Linux-based solution they implement.

And they fear being left out in the cold as the world around them converges on a single company's proprietary standards.

At LinuxUser, we're not OS bigots. We aren't trying to persuade people that a single operating system is the answer for everything, and they wouldn't believe us if we did.

But we do believe that organisations today would be unwise not to consider the benefits of Linux and open source/free software. And we aren't going to hide the fact that we'd like to turn Linux contemplators into Linux users.

How do we aim to do this?

We can show how the co-operative, open model of development means better, more reliable software.

We can provide reassurance that the development base of Linux is strong, and that every day sees more users adopting and more vendors announcing their support.

And we can confirm that the tide is turning very swiftly away from vendor-specific protocols and formats in favour of openness and interoperability.

As advocates of Linux and open source/free software, we don't need to rely on cheap jokes about the inadequacies of certain other software products (although it's hard not to laugh sometimes!).

But we do need to present the evidence persuasively, and in doing that, we'll be trying to take a lead from the values and

Open for business



At LinuxUser,
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a single
operating
system is
the answer
for every-
thing...

strengths of what we're promoting.

Linux means independence, freeing you to make decisions in your own interest and opening up a new world of choice. LinuxUser aims to help you take control, giving you access to impartial information. While many other sources are owned by media corporations with something other than a magazine to sell you, we can focus on the interests of the Linux user.

Linux means reliability, allowing you to devote precious resources to meeting your core challenges, not constantly solving computer problems.

Where so much IT media is hooked on the perpetual upgrade cycle, praising products just because they're shiny and new, LinuxUser looks for the value behind the hype, focusing on reliability and total cost of ownership.

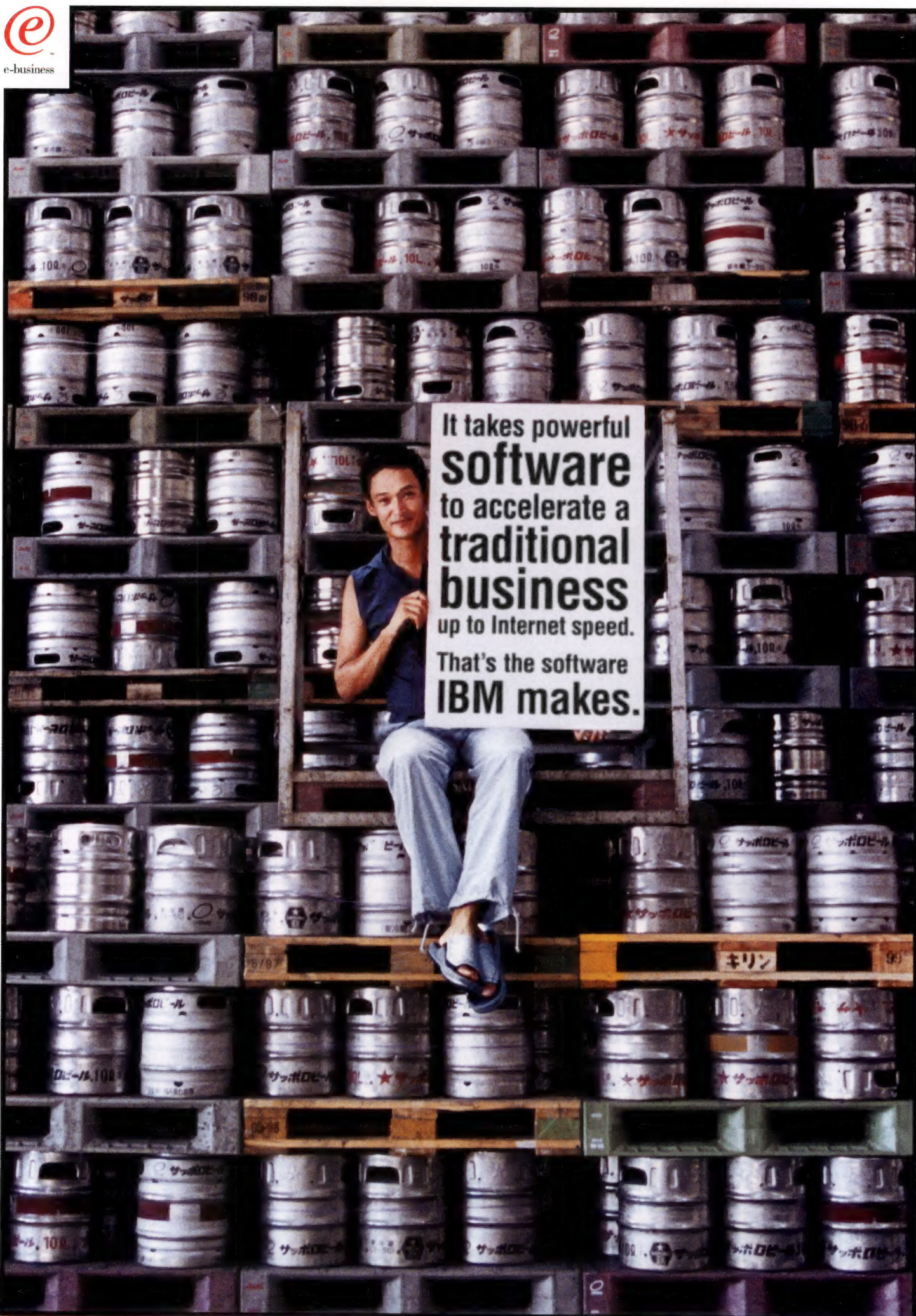
Linux means openness, with the needs of users as the primary motivation, and with no hiding place for substandard and manipulative coding. In LinuxUser's opinion, users rule OK. Hearing from the people with products and services to sell is fine, but what you most want to see is real-life Linux at work. That's why we're opening up these pages to the widest spectrum of opinion and experience. If you've got a strong story that Linux users need to hear, tell them through LinuxUser.

And Linux means co-operation, where an army of users scattered all around the globe can build a world-beating operating system and where contributing one hour's effort to a project can give you 20 hours' worth back. LinuxUser believes it can only benefit by putting something back into the pot, and that's why we have decided to sponsor the Linux Training Materials Project (see page 41) – a very worthwhile project that's going on right here in the UK.

By following these objectives, we hope we can convince even the most doubting that making a foray into Linux, far from straying into uncharted territory, is actually giving them back the map. They'll be moving from a position where they are forbidden to examine the code on which their organisation depends, and where they have to trust a single source for everything, into an environment of choice and control, where openness fosters innovation, excellence, competition and real economic benefits.

That kind of freedom doesn't mean losing anything. Far from it. As Janis Jopling sang in the next line of 'Me and Bobby McGee': 'It ain't nothing, honey, if it ain't free...'

The Publisher would like to thank all the staff, contributors and supporters of LinuxUser who have made the impossible possible. In addition, and especially, Emma and Hugh McNicholas, John and Mary Ann McNicholas and Terry, Frances, David and Loretta Meer for their encouragement, patience and inspiration. Thank you.



Software is the soul of e-business.™

More and more businesses are realising that e-business is the way of the future. They also realise that e-business is about more than just buying or selling online – that they can use Web technology to deal with their suppliers and distributors securely online; to automate their supply chains; to serve their customers better. IBM Software can get your e-business up and running fast, by Web-enabling your existing systems. And linking them seamlessly to everyone you do business with. Already, we've helped over 25,000 companies become e-businesses. No-one is in a better position to help you as you move forward. Who knows how far you can go?

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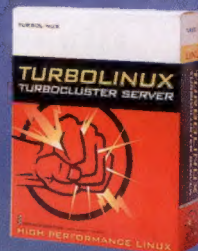
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Survey puts Compaq ahead in Linux server market

The real winners of the Linux revolution are not the 'cottage industry' operations most in tune with the open source operating system's ethos, but the giants of IT, according to the latest figures from market research company IDC.

However, IDC's claims have already been challenged by one Linux hardware specialist, US-based VA Linux Systems.

According to IDC, Compaq sold more Linux servers than any one else during the last three months of 1999, and the top five was dominated by the usual hardware suspects: IBM, Hewlett-Packard, Dell and – the one exception – Fujitsu Siemens.

Compaq dominates the Linux server market with a share of just under 25%. It sold 18,000 servers in Q4 1999. IBM managed much less than half of that – 7000 units – leaving it with 10% of the market. HP sold 5400 machines (7.5%), Dell 5200

servers (7.2%) and Fujitsu Siemens 2300 (3.2%).

Still, that leaves the "others", including Penguin Computing and VA Linux Systems, holding 47.1% of the market. With Linux's share of the overall server market growing at a rate of 166%, according to IDC, that at least

means there's still plenty of the cake left for the smaller operators.

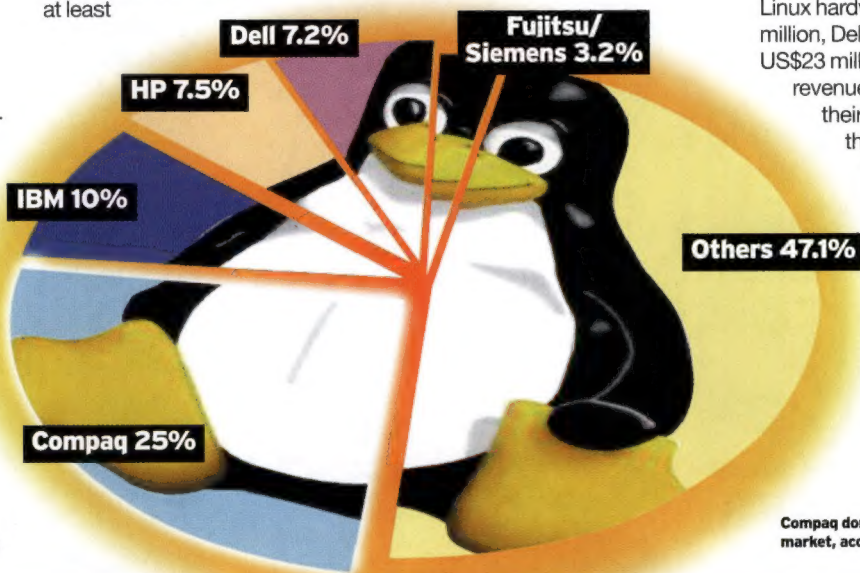
VA, however, quickly claimed that IDC's figures weren't entirely correct. It says it sold 3465 servers during its second fiscal quarter, which ran from November 1999 through

January 2000.

Even allowing for higher sales in January 2000 than October 1999, the first month covered by IDC's figures, VA believes it should still take fifth place ahead of Fujitsu Siemens.

Meanwhile, in revenue terms, Compaq made US\$84 million in Linux hardware sales, IBM US\$33 million, Dell US\$24 million and HP US\$23 million. Assuming their revenue shares broadly match their unit market shares, that leaves the total Q4 1999 Linux server market worth some US\$410 million.

Linux holds just 6% of the sub-US\$100,000 server market, worth nearly US\$8 billion altogether.



Compaq dominates the Linux server market, according to figures from IDC.

Professional standards body launches second exam

The Linux Professional Institute (LPI) has taken its plan to define a universally accepted standard of expertise in Linux a step further with the release of its second examination, dubbed "102".

The exam and its predecessor, "101", now complete the tests a Linux specialist must pass to receive LPI's Level 1 Certification. Both exams test a candidate's basic knowledge of Linux, and can be taken in any order.

'With the release of exam 102, candidates will finally be able to take both exams necessary to complete Level 1,' said the president of the LPI's board of directors, Dan York.

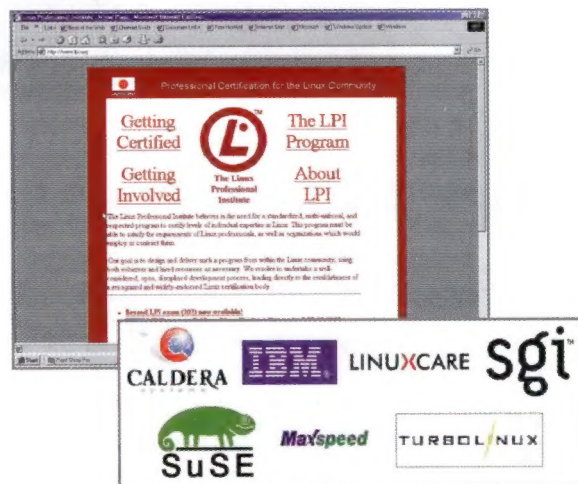
Would-be certified Linux specialists can take the LPI's two exams at any of the Virtual University Enterprise's 1700 testing centres worldwide. Over 140 training cen-

tres have now registered with LPI that they target Level 1 Certification in their courses and products; the centres are listed at www.lintraining.com

The LPI itself is a non-profit project formed last year to define a series of vendor-neutral standards for expertise in Linux. Clearly, as more of the world's leading companies turn to Linux for their IT needs, many of them will increasingly demand that staff prove they possess the Linux skills they claim to offer.

As Linuxcare's general manager for training, Pat Montgomery, puts it: 'The business acceptance of Linux hinges on the credibility of vendor-independent professional certification.'

The LPI is sponsored by Caldera Systems, IBM, Linuxcare, Mandrake, SGI, SuSE and TurboLinux. www.lpi.org



The LPI's efforts to ensure Linux specialists are professionally qualified are sponsored by many of Linux's leading supporters.

UK's leading Linux exhibition reflects growth in market

If proof is needed of the surge in popularity of Linux within UK organisations, then look no further than the year-on-year increase in exhibitors and pre-registered visitors at this year's Linux Expo.

Now in its second year, the UK's largest dedicated Linux exhibition and conference is expected to attract 35% more exhibitors than last year's Expo, with a likely 70% increase in visitors.

Linux Expo 2000 brings together major Linux vendors with the users, influencers and decision-makers responsible for buying and implementing Linux-based systems. It will take place at Olympia 2, London, on 1 and 2 June.

Among the 80-plus exhibitors at Linux Expo are the computing industry's major Linux distributors, supporters and application vendors, including Red Hat, Intel and Corel (see right).

Other features of the Expo include The Great Linux Debate where leading industry spokesmen and Linux experts will put forward their views on the role of Linux, now and in the future. Participating companies will include Red Hat, SuSE, AlphaNet, Corel, Intel, Hewlett-Packard and IBM.

A wealth of Linux information will also be available through the Expo's programme of free Strategic Briefings, comprising more than 30 free presentations by major open source companies. There will also be a series of Workshops aimed at providing IT managers and developers with independent information on implementing Linux-based systems within their organisations.

To register for both the Linux Expo, The Great Linux Debate, and the programmes of seminars, visit the Linux Expo Web site at www.itevents.co.uk/exhibitions/linux/, before 26 May.



• Linux Expo,
Thursday 1 June
(10.30 - 5.00) and
Friday 2 June
(10.30 - 4.30)
[www.itevents.co.uk/
exhibitions/linux/](http://www.itevents.co.uk/exhibitions/linux/)

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LINUX EXPO 2000

selected exhibitors*

EXHIBITOR	STAND
Allied Dunbar	140
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Alphanet Linux	130
APC	124
Application Developer Advisor	TBC
Baydei	125
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* correct at time of going to press

PRODUCT BRIEFS

Compaq has signed a deal with Red Hat to offer Red Hat Linux 6.2 with its AlphaStation workstations, Alpha-based AlphaServer DS and ES machines, Intel-based ProLiant server and selected models in its DeskPro PC range. The agreement allows Compaq to bundle the OS with its hardware, and to pre-install on machines' hard drives.

Deneba Software has released the latest public test version of Canvas 7, its feature-packed graphics application. Long a hit on the Mac, Canvas now offers professional drawing, diagramming, technical illustration, image editing and page layout tools on Linux. The test release requires glibc 2.1 or above, and is available from www.deneba.com

Once the photo-editing tool on the Amiga, Photogenics is now being ported to Linux, and the latest public test version is available from developer Paul Nolan Software. Photogenics 4.5 brings some very intuitive tools to photo-editing - instead of applying filters to specific areas, you simply 'spray' them on. Erasing mistakes is just as easy. The download is at www.paulnolan.com

OpenLinux distributor Caldera Systems has released eBuilder, its full-featured e-commerce system. Based on OpenLinux eServer, a compact version of the OS, eBuilder is designed to make it easy to adapt and transfer existing commerce set-ups to the Web. The software includes IBM's WebSphere server software and Evergreen Ecential commerce framework. www.calderasystems.com

Disk management software developer PowerQuest, best known for the PartitionMagic utility, will support Linux's ext2 and SWAP drive formats in the next version of its Drivelmage tool, 3.0. Drivelmage allows users to compress and back up hard drives onto removable media, such as Zip or CD-R disks. It costs US\$69.95, direct from PowerQuest. www.powerquest.com/

New VA MD heads expansion into Europe

VA Linux Systems has appointed William Cobert to head up its expansion into Europe. Cobert was most recently managing director of SGI's Southern European operations.

Dr Larry Augustin, president and CEO of VA Linux Systems, said of the new managing director's appointment: 'We are very pleased that William Cobert has joined VA to help us take advantage of the

tremendous demand for Linux solutions in the European Internet market - and work with the wealth of outstanding talent in the Open Source developer community in Europe.'

VA Linux Systems is currently establishing operations in France, Germany, the UK and The Netherlands. The company's European headquarters will be in

Switzerland.

Robert Russo, VA's general manager and senior vice president, said the initial response in Europe had been very enthusiastic. 'Our new European team is exploring business relationships with other companies and is in the process of recruiting talented Linux engineers and salespeople to ramp up VA Linux Systems' entry into Europe.'

Cyclades

The Leader in
Linux Connectivity

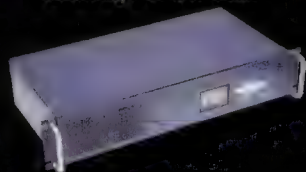
Is Now In the UK

Cyclades Corporation designs and manufactures networking hardware in California, USA.

Cyclades, the Leader in Linux Connectivity now has its product line available through MPT Data in the United Kingdom which means better service and support to you.

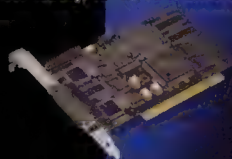
Cyclades-PR4000 RAS

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ISDN-PRI, V.90 MModems



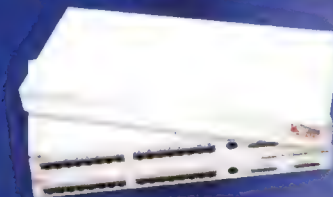
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PPP, Frame-Relay, X.25/X.21 interfaces



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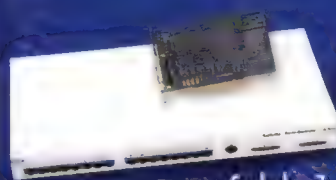


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VA targets desktop market with Linux PC



The StartX range brings affordable Linux computing to the desktop.

VA Linux Systems has unveiled a desktop computer pre-installed with Linux, a move that suggests the hardware company believes the open source OS is ripe for the small to medium-sized business market and not just for servers.

The StartX range comes in at under US\$800, although the cheapest machine ships without a monitor. The basic configuration, the StartX SP, sports a 500MHz Intel

Celeron processor, 10.2Gb or 20.4Gb hard drive, 64-256Mb RAM, unspecified CD-ROM drive and choice of 17in or 19in monitor.

The StartX SP2 line offers a choice of 466MHz Celeron or a Pentium III (at 533MHz or 733MHz) CPU, 10.2Gb or 20.5Gb hard drive, 48x CD-ROM, 64-128Mb RAM, and either no screen, or a 17in or 19in monitor. VA has bundled a SoundBlaster sound card and a network card. Graphics acceleration is integrated into the machine's Intel 810E chipset.

VA is also offering the dual Pentium III StartX MP, with two 550MHz, 600MHz or 700MHz CPUs, 256Mb or 512Mb RAM, 40x CD-ROM, 8Mb Matrox G200 AGP or 16Mb Matrox G400 AGP graphics card, network cards, and 10.2Gb to two 18.2Gb hard drives.

VA is aiming the systems at businesses looking to buy cheap desktop Linux boxes that can provide their staff with basic Internet access tools and hook into their main applications. The StartX family should also appeal to hobbyists, Web site developers and programmers – users who want a solid Linux system but would prefer to avoid setting the OS up.

www.valinux.com/systems

Microsoft break-up gives boost to Linux stocks

The expected break-up of Microsoft has helped push up Linux stocks again after a disastrous start to the year.

Software companies Red Hat Linux and Caldera Systems had both been hit by investor concern that their stocks were over-valued, as had hardware businesses like VA Linux Systems and Cobalt Networks. Red Hat, which conducted its IPO last autumn, saw its stock hit US\$151 per share during December 1999. More recently, it had fallen to under a sixth of that. VA also made headlines last December when it recorded the highest IPO-day growth in share price and hit a peak of US\$320 per share. But its stock was recently worth less than 10% of that figure.

However, as LinuxUser went to press, investors were pouring hundreds of millions of dollars back into Linux companies with VA Linux

Systems' stock up 44% to US\$60, Red Hat up 11% to US\$27, Caldera Systems up 16% to US\$15, and Corel Corp up 20% to US\$7.

The likelihood of Microsoft being divided into two companies, one for operating systems and the other for application and Internet software, could help Linux companies, thought analysts. One commented: 'As an operating system, Linux may certainly gain the most if there were to be a breakup.'

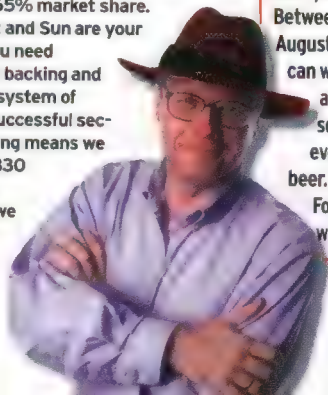
However, he added that two factors could hold Linux back. First, the new Microsoft applications company probably wouldn't write for Linux unless the operating system had significant market penetration. Second, there's no guarantee Microsoft applications would run smoothly on top of Linux.

Another analyst said that Linux's market share would have to reach at least that of Apple (which has 5% to

8% of the desktop market) to become viable. However, he added that Linux would benefit from computer makers being freed from their exclusive deals in the event of Microsoft breaking up, with hardware vendors presenting their products as 'solutions rather than vehicles for Microsoft products.'

Red Hat bullish

'We're still trading way, way above our initial float price,' Red Hat's European vice president Colin Tenwick told LinuxUser, 'reflecting our 65% market share. When Microsoft and Sun are your competition, you need strong financial backing and the correct ecosystem of partners. Our successful second round offering means we have over US\$330 million in cash, giving us what we need to be able to deliver on our strategy.'



LINUX EVENTS

Eddie Bleasdale of the open source-oriented NetProject organisation will be running a series of workshops around the country in June on 'Linux, Open Source & e-commerce'.

Bleasdale believes that e-business systems must be stable, highly reliable, secure, robust and virus resistant.

The workshops are in association with the National Computing Centre, and you can find more details at www.netproject.com

If you're looking at implementing Linux in the enterprise, you may be interested in a couple of introductory public courses which Linux consultancy and training organisation, GB Direct, is running on 12 June.

'Running Linux with Windows/NT in the Enterprise' is a three to five day course aimed at systems support and administration staff who wish to run Linux alongside Windows and NT servers in the enterprise. The course is based in London and costs £675 per delegate.

'Linux - The Commercial Reality' is a one day course suitable for managers, administrators and developers who wish to understand where Linux fits in the future of network and desktop operating systems. It is based in London but is also available on-site. GB Direct runs regular training courses in-house, through distance learning and at public venues. www.trainingpages.co.uk

Fancy combining your love of the great wide-open with your love of Linux and appreciation of good ale? Then this summer's Linux Beer Hike in the Lake District is for you.

Between 30 July and 6 August Linux enthusiasts can walk during the day and attend seminars each evening. And drink beer.

For more details, visit www.lbw2000.eu.org

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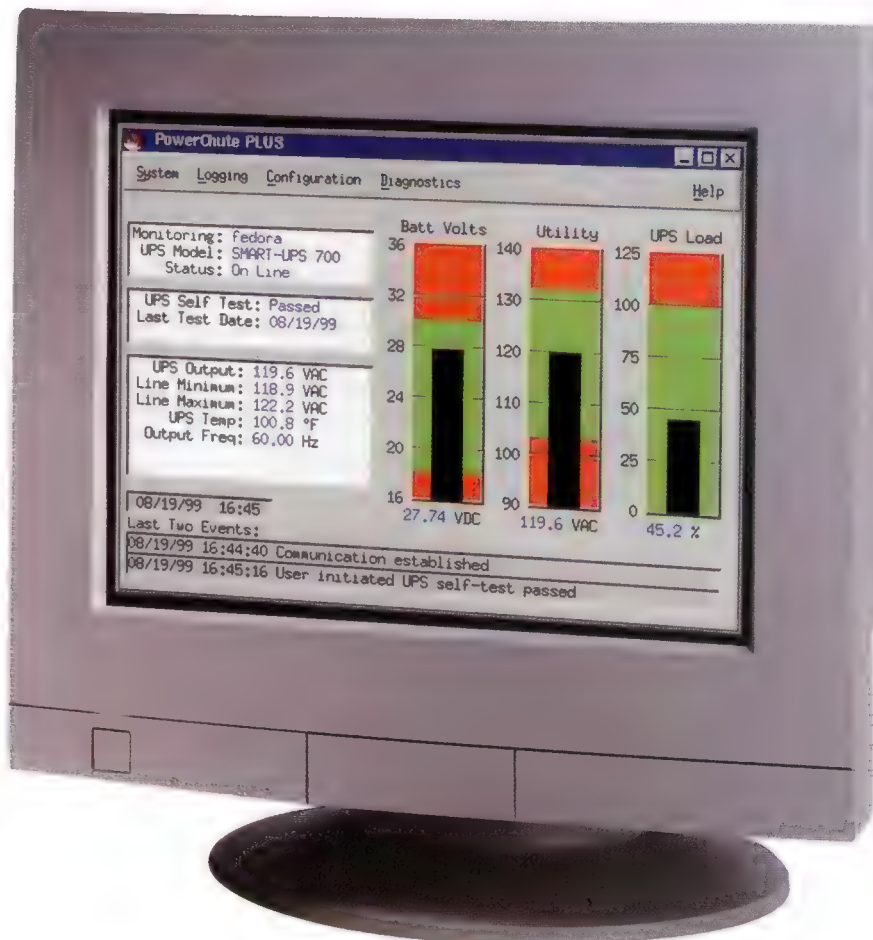
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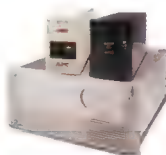


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Paul McNamara, General Manager,
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DEVELOPMENT BRIEFS

Chip-maker Intel is to release its powerful e-commerce oriented security software under an open source licence. The software supports the Common Data Security Architecture (CDSA), an established standard. Open sourcing the code is intended to make it more accessible to developers, which in turn should encourage the sale of Intel's encryption and decryption chips.

Corel has bought a 10% stake in Simply.com to encourage it to bring its videoconferencing systems and streaming media software to Linux. Eventually, Simply.com technology will be integrated into Corel Linux. The deal comes six months after Corel sold its bought-in videoconferencing software Corel Video to Simply.com. www.linux.corel.com

Eazel, the company founded by a handful of Apple veterans to create a next-generation Linux desktop user interface, code-named Nautilus, has received US\$11 million in first-round financing to help it in its task. Eazel's GUI will become part of the Gnome desktop environment, replacing Gnome's existing look and feel. www.eazel.com

SuSE Linux has partnered with Bristol Technologies to promote Bristol's Wind/U Windows-to-Linux software development technology. Wind/U enables developers to compile Windows code directly on SuSE Linux to create native Linux applications. The arrangement also covers Bristol's Linux Porting Center, a Wind/U porting and native Linux development training facility. www.suse.com

Red Hat has launched Redhat.com Marketplace, a Web-based one-stop shop for IT professionals keen to build - or learn how to build - Internet infrastructure systems based on Linux and in particular Red Hat's version of it. The site provides e-commerce links to system and software vendors, including Dell, IBM, Compaq, Oracle and Symantec. www.redhat.com/marketplace

CorelDraw and PhotoPaint set for Q2 release

Corel has moved quickly ahead with its aggressive Linux software release schedule. Now that WordPerfect Office 2000 has been released, the company said it expects to ship Linux versions of Corel PhotoPaint 9 and CorelDraw 9 in June and July, respectively. If Corel meets its new schedule, CorelDraw will arrive two months early. The company claims that CorelDraw 9 will be the first 'robust, mature and full-featured' graphics suite to be released for the open source OS.

CorelDraw provides a host of drawing tools and clip-art, and while

it hasn't been the graphics package on Windows for some time, it has kept up with the tools that outshone it. Corel PhotoPaint, meanwhile, offers a full set of photo editing and painting tools.

Once these two applications have shipped, Corel will focus its efforts on Corel Ventura Publisher 8.5, a powerful PC DTP tool that has been overtaken by more powerful rivals. But since Linux lacks a solid page layout application, Ventura's arrival 'by the end of the year' should prove a welcome one.



Corel's graphics packages, CorelDraw 9 and Corel PhotoPaint, will be available for Linux this summer.

AOL Gateway consumer Net appliances utilise Linux OS

A family of AOL Gateway specialised consumer Internet appliances, due later this year, will utilise the Linux operating system.

The trio of devices - the AOL Gateway countertop appliance, wireless Web pad and desktop appliance - are small, lightweight tools which use Netscape's Gecko browser engine technology and Linux, with the 'Instant AOL' feature to automatically launch the service as soon as the device is switched on. This makes AOL's content, features and services available to users wherever they are. Members can get online via the appliances' touch-screens, wireless keyboards or traditional keyboards.

The countertop appliance has a flat-panel LCD touchscreen display and can be mounted on any surface. It is particularly suited to highly trafficked areas, like the kitchen, where all the family can use it to access the Internet.

The Web pad weighs less than three pounds and its portability makes it suited to remote use within the home. The desktop appliance is larger than the other two devices and offers a lower-cost alternative to a PC.

Bob Pitman, AOL's president and CEO said the appliances 'will enable consumers to do everything from checking news headlines to ordering groceries or even updating the family calendar from virtually anywhere.'

AOL is the world's leading interactive services company and Gateway the leading seller of consumer PCs by revenue in the US.

TurboLinux & Oracle expand enterprise support

TurboLinux and Oracle have announced a strategic partnership which strengthens their commitment to providing Linux-based solutions to enterprise customers. TurboLinux will optimise its TurboLinuxServer operating system for Oracle 8i and Oracle will take an equity position in TurboLinux.

The two companies also plan to work with Huadi, China's largest system integrator, to meet the growing demand in Asia for Linux-based enterprise solutions.

Commenting on the relationship, Cliff Miller, CEO of TurboLinux, said: 'By partnering with Oracle, we are better able to deliver on our promise

to provide our enterprise customers with high performance, scalable, reliable and highly available Linux solutions.'

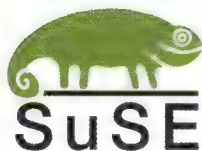
Michael Rocha, senior vice president of Oracle's Platform Technologies Division, added that the partnership would 'help solve the immediate needs of our Linux customers in Asia who are looking for a reliable platform upon which to build e-business solutions.'



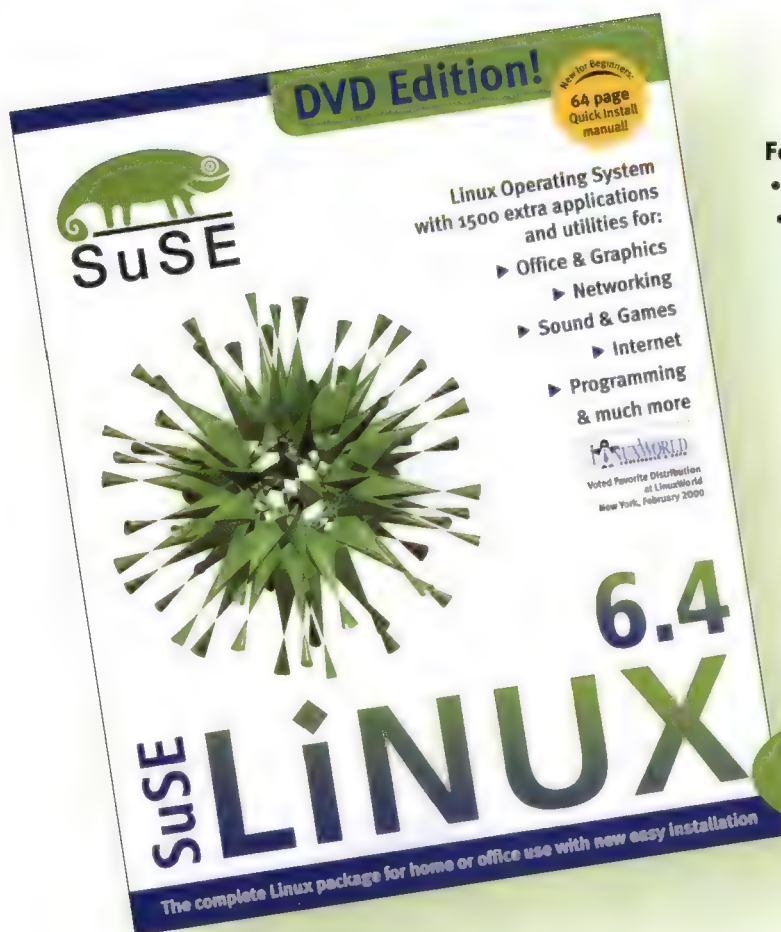
'Better able to deliver on our promise' - Miller, TurboLinux CEO

'Distributed database support is crucial for this type of workload,' said Dan Kusnetzky, vice president of system software research for International Data Corporation. 'Oracle brings the expertise and the software for distributed database applications. TurboLinux brings the Linux expertise and software.'

'This partnership is likely to help bring Linux into organisations that may not have considered it in the past,' he added.



SuSE Linux 6.4



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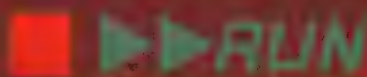
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New group to accelerate Linux standard for software development

The establishment of a single Linux standard for software development has been given a boost with the formation of the Free Standards Group, incorporating The Linux Standards Base (LSB) and Linux Internationalization Initiative (LI18NIX).

The function of the Free Standards Group is to hasten the use and acceptance of open source technologies through the application, development and promotion of interop-

erability standards for open source development.

To prevent the fragmentation of Linux into several versions, each supported by different applications, the Free Standards Group will promote a specification which enables any LSB-compliant application to run on any LSB-compliant Linux distributions. It will also define a common subset of Linux that will work for everyone, regardless of distribution.

'The Free Standards Group's efforts will be an important component of the continued success of open source,' said Linus Torvalds. 'Standards such as the LSB and LI18N help bring different companies and groups together to solve common problems and will help to advance Linux in a good way.' 'We have everything we need to move forward quickly in increasing compatibility among Linux and other open source distrib-

utions,' commented Daniel Quinlan, chair of the standards group, 'and in helping to support software vendors and developers to port and write software for open source such as Linux.'

A number of key companies and public interest groups have endorsed the Free Standards Group, including The Debian Project, Corel, Red Hat, Linuxcare, IBM, SuSE, TurboLinux and Sun. www.freestandards.org

Linuxcare cuts jobs and pulls IPO plan

San Francisco, California-based Linux service and support specialist Linuxcare has been forced to slash its workforce and can its initial public share offering following a pummeling of hi-tech stocks and the sudden departure of CEO Fernand Sarraz.

The firm has admitted it will have to make redundancies but hasn't said how many. Analyst expectations put the figure at 25 per cent of the company's workforce.

'It is true that the measures we took were painful,' said new CEO Pat Lambs. 'We feel strongly, however, that the reduction and realignment of our workforce will strengthen Linuxcare.'

Linuxcare had already massively downgraded its IPO expectations. Its first IPO registration document noted the company anticipated raising US\$92 million out of the share issue. Later that was cut to just US\$56.6 million.

Next, the IPO was put on ice.

Linuxcare has not decided when the IPO programme will be restarted, but the company's financial crisis suggests it won't happen for a long time yet.

Given the environment on Wall Street overall, it may not have been an opportune time to go public. 'The question is when one of these [Linux] companies will become profitable,' Giga Information Group analyst Stacey Quant told US newswires.

And profit is key, primarily since Linuxcare has yet to make any. As a private company, Linuxcare does not have to publish its results, but its IPO registration documents noted revenues of US\$518,111 and losses of US\$10.6 million for the time between its formation in January 1999 to 30

September 1999. By the end of the year, revenues had risen to US\$1.5 million, and the loss to US\$21.3 million.

Linuxcare planned to spend its US\$56.6 million on sales and marketing efforts, and equipment. Linuxcare's business is founded on major service providers outsourcing their Linux support. If the demand for Linux support continues to grow, that's good news for Linuxcare, but service providers may equally

decide they're better off fielding their own, in-house expertise.

Over half of Linuxcare's revenue last year came from just three companies: Sun (26 per cent), Motorola (18 per cent) and SGI (11 per cent). If just one of them drops the company, Linuxcare is going to have problems.

Indeed, it may well be having them anyway. The company's venture capitalist backer, Kleiner Perkins Caufield & Byers, is said to be actively searching for someone to buy Linuxcare. The most likely candidates are said to be Red Hat and VA Linux. www.linuxcare.com

'We feel strongly, that the reduction and realignment of our workforce will strengthen Linuxcare.'

Pat Lambs CEO

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The Road To Freedom

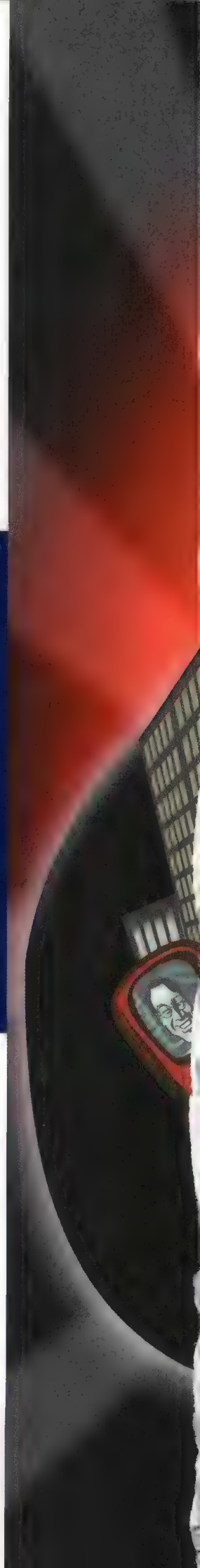
In under a decade, Linux has risen to become the most popular Web server environment and a serious alternative to Microsoft in the enterprise. **Jane Lewis and Trevor Parsons** chart its progress and consider the prospects for its wider acceptance in the mainstream

'Just a hobby, won't be big and professional,'

wrote Linus Torvalds on 25 August 1991, as he advertised on the net for fellow hackers to help with the homegrown strain of UNIX he was working on. Yet in less than a decade, the operating system kernel which bears his name has evolved a million miles - and several billion dollars - from its humble origins to a position of such influence that commentators are hailing it as the only really viable challenge to the might of Microsoft. Having conquered the Web server market, Linux has also begun to make significant inroads into the mainstream corporate enterprise server arena - and is even being tipped as a possible challenger to the Gates stranglehold on the desktop.

To many observers, the rise of Linux was bewildering. It just didn't fit in with the traditional pattern of a successful operating system. For starters, its packaging into several hundred different distributions brought back chilling memories of the 'forking' of UNIX into numerous incompatible systems - the Achilles heel which allowed Microsoft to forge ahead in the small-to-medium enterprise server market during the early to mid 1990s. Worse still, Linux was free software, with its source code in the public domain - placing it in a category which was until recently an absolute no-no in the boardroom.

Below stairs, though, the people who actually make corporate systems tick have been quietly exploiting the advantages of Linux and free software for years. They understood that Linus Torvalds' tight control over the evolution of the kernel would ensure continuing interoperability, whatever distribution flavour they selected, and they positively relished the chance to read - and improve - the





Lancaster Insurance Services

Lancaster Insurance Services is an established insurance brokerage specialising in classic cars and motorcycles. In April this year, the company launched its first interactive Web site running on Linux; it is also running the OS on a separate server handling all its email. 'We'd been looking at Linux for the last three or four years, but there was all this rhetoric which said you've got to be slightly careful. After a while I started to wonder why,' says IT manager David Martynsky. On investigation he found that many of the fears about resilience, lack of support and so on were groundless. 'It's a load of old baloney.' Instrumental in this elimination of doubt was Linux specialist GB Direct, which impressed Martynsky by getting both the Web site, which is hosted in-house, and the email server up within a week - and in the process gave Lancaster's IT staff some hot tips on some of the quirkier aspects of the system. But, since Lancaster is an established SCO UNIX house, Martynsky says the training transition was straightforward. He has also found the tight-knit Linux community a boon. 'We put out a small problem we had with the email to the user group and got 15 replies.'

He admits that at first the prospect of gaining a system licence-free 'was almost a negative point: the perception is you don't get anything for free unless it's a Mickey Mouse thing'. But now it's up and running all that's changed: 'We would make the freedom from licence restrictions an extremely high priority in the future. We would have no problems whatsoever about extending Linux across the whole enterprise.' The only thing stopping this happening now is that the current systems are 'so engrained with SCO'. Contact: David Martynsky: 01480 484860.

source code. Most importantly, they valued Linux's famed reliability and the fact that, combined with a tried-and-tested set of tools courtesy of the Free Software Foundation's long-standing GNU project, it fits with ease into an ever more Internet-oriented business environment.

By late 1998, Tux the penguin - an incongruously cuddly mascot for the by now powerful, adaptable Linux - was waddling onto the analysts' radar. Fair-sized enterprises were feeling confident enough to take the plunge and spurn Microsoft. In the same month in which Seattle-based clothing retailer Jay Jacobs opted for a Linux-based back office solution to service its 100-plus stores, Microsoft's fears about the threat of open source became clear with the leak of its internal anti-Linux strategy papers (the infamous 'Halloween Documents'). With Microsoft literally in the dock, the invigorating potential of the open source model seized the imagination of the markets, which encouraged bold strategic partnerships and armed the established players with the investment they would need for the struggle ahead. Flagship Linux distributor Red Hat took the crown in August 1999, enjoying one of Wall Street's most spectacular IPOs with a staggering launch value of US\$10.3 billion - a success fuelled in no small part by the number of high-profile backers it had wooed. As well as, crucially, the chip giant Intel, these included a line-up of big hardware companies like IBM, Compaq and Dell which, as the quintessentially mainstream publication *Vanity Fair* baldly put it, 'hate being at Microsoft's mercy.'

Industry support went further still. By mid-1999, such high-end corporate software stalwarts as Oracle, SAP, Informix and Computer Associates had all started work on Linux releases. Meanwhile, soon after VA Linux had set a new record for first-day gains in its own IPO, Red Hat joined forces with CERN, Hewlett Packard, IBM and SGI, as well as other leading Linux distributions Caldera, SuSE, and TurboLinux, to back VA's Trillium project to port Linux to Intel's upcoming Itanium 64-bit processor - the platform which, it is forecast, will prove to be a watershed for Linux.

Onwards and upwards

This sudden rise to prominence clearly caught many of the industry's movers and shakers on the hop. 'Although Linux was a functional operating system by 1994,' says Dave Fisher, head of business development at UK-based Linux training and development consultancy GB Direct, 'effectively it was percolating away very slowly in the grass roots of the industry. Only in the past 18 months has it

gained ground with non-technical managers.'

'Linux is quite a phenomenon. It's taken us somewhat by surprise that it's grown so substantially in such a short period of time,' remarked Brian Sanders, brand manager for IBM's Netfinity line of Intel-based servers, last year. In common with IBM, such established UNIX hardware heavies as Sun, HP, Compaq and Silicon Graphics have all thrown their weight behind the operating system and the open source software model. According to Tony Walden, UK UNIX marketing manager at HP, Linux is up there with HP-UX and Windows NT as one of the three main OSes his company is backing. HP doesn't want to be caught playing catch-up when Linux does take off beyond Web-based installations. Although penetration has been 'reasonably good in technical development areas - at the technical workstation end of the market and in the Web development space', sales in the traditional enterprise computing area have some catching up to do. 'Linux is typically being embraced by UNIX gurus who've been around in the industry a long time,' says Walden.

This is hardly surprising, counters Red Hat's European vice president Colin Tenwick, given the fact that the market is still so young. 'From an anecdotal point of view I would put Europe at around 12 months behind the US,' he says. Anecdotal indeed, since the rise and rise of Linux has also taken the market researchers by surprise, making an accurate assessment of its impact in Europe tricky.

Possibly the best indicators available are those provided by IT analysts IDC and by Netcraft, the UK-based online diagnostics organisation which pinpoints who is using what on the net. Netcraft figures show that Linux overtook Microsoft as the most commonly implemented net server OS in July 1999, and has accelerated each month since then to a position where it now powers around 30 per cent of public Web servers. And Apache, the open source Web server which comes with Linux distributions, completely dominates the web server market at 60 per cent.

In the medium term, though, Linux's credibility will depend on its ability to take market share from its competitors across the whole range of server duties, and IDC worldwide figures appear to show this process already well under way. In 1999, 25 per cent of all server software purchased was Linux, moving up on Microsoft NT, which didn't budge from its 38 per cent share. 'That was up 17 per cent on the year before,' says Tenwick, 'and the year before that Linux sales weren't even recorded. The growth projected for this year is almost 100 per cent.'

**LINUX
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AS THE MOST
COMMONLY
IMPLEMENTED
NET SERVER
IN JULY 1999,
AND HAS
ACCELERATED
EACH MONTH
SINCE THEN**

Powys County Council

The Welsh county of Powys has a population of 120,000 spread across a wide area, so IT offers a great potential to link disparate individuals and communities together, enabling them to communicate and exchange resources. Powys County Council operates a number of projects aimed at bringing IT closer to its citizens, and has chosen to use free and open source software to make them happen.

Powys started using Linux around five years ago, and got very familiar with the

Slackware distribution (www.slackware.com), which still forms the basis for all its current Linux work. Current projects include: Computerised Communities, the Linux Box Project, the National Grid for Learning (NGfL), the Powys Web sites and a system of telecentres which give people easy and free access to IT resources and the Internet.

Apache - the world's favourite Web server software - serves over 160 of Powys's Web sites, and is also the Council's standard intranet Web server. Interactive content on all its Web sites is provided by PHP - a companion product to Apache which lets program-

mers develop interactive Web content drawing from information held in databases, directories, networked file systems, in fact anything you can think of! A good example is PowysWeb (www.powysweb.co.uk), and PHP is also at the heart of its NGfL systems.

MySQL - a SQL database server that has rapidly established itself in delivering Web services - provides great flexibility in the intranet environment, with connections via ODBC or native applications for Windows clients. Another tool enabling continued use of legacy Windows clients is the MARS Network emulator, which lets users have simple

access to their files on Linux Web servers so that they do not need to learn to use FTP to maintain their Web site.

Mail delivery services for schools and community organisations and with a number of economic development projects is provided by the Exim mail server, developed by the University of Cambridge, while the Open LDAP directory server provides email directories for all council email accounts, with separate directories for schools and third sector organisations.

According to IT Strategy Manager Nick Talbott, Powys can find a good match for their needs by a combination of free

and open source software applications. 'Proprietary solutions may give us little or no choice over what comes with the package,' he says, 'and because we are not constrained by licensing costs, we can roll out solutions that are technically the best approach, even in situations such as small community centres where we could never justify the cost of commercial systems.'

He has nothing but praise for the Internet community: 'I can't thank them for making these valuable applications available to us.' Contact: Nick Talbott, nickt@powys.gov.uk

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Tenwick claims the most mature European market at enterprise level is Germany, then France, with the UK coming in third. 'But we're starting to see some good penetration in the UK at enterprise level. Each week we're finding different customers coming on board - from a big petroleum company, to the latest funky Web site - virtually every dot.com is running Linux and it's huge in the ISP market place.' A notable UK convert in recent months has been the Norwich Union's nationwide estate agency arm, Hill House Hammond. But Tenwick also notes strong interest in the retail and telecoms sectors. 'These two markets are really starting to bubble, and they're coming in as a result of applications.'

One reason why Linux is doing so well in Germany, he adds, is down to the strength of the SAP installed base there. Since the software giant ported its applications to Linux, there have been over 300 wholesale conversions to the operating system - including the motor industry giant Autozone, 'the German equivalent to KwikFit'.

Perhaps the most surprising convert in the UK is the Government - a notoriously conservative institution when it comes to IT purchasing. Last October, some 85 Government servers - including, famously, the one running the Royal Family's Web site - switched from Sun Solaris to Linux. Malcolm MacSween, managing director of Enterprise Management Consulting, quotes Government sources as admitting that 'Linux just blew the competition away'. 'It was the choice of the technical staff at the CCTA [the government central IT purchasing agency],' adds Dave Fisher at GB Direct. 'At managerial levels, however, the government is still buying Microsoft stuff - none of the managers have the guts to put forward Linux because there's still a "geek" stigma attached to it.' Thus despite wholeheartedly embracing Linux at Web server level, Fisher says that in a recent large tender to provide traditional office services to government departments, the OS was nowhere in sight in the bids put together by Andersen, EDS and IBM. Across the English Channel, by contrast, interesting developments are in progress, with senators Pierre Laffitte and René Trégout forging ahead with their proposal to make free software the open standard for the public sector in France.

Plus points aplenty

The tendency to draw a tight distinction between what runs at Web server level and what's in play throughout the rest of the operation is beginning to break down in many organisations - as the boundaries between e-commerce and traditional business functions begin to blur. Indeed, one reason why so many analysts are backing Linux as a future winner across the enterprise is because of its ability to gain entry via the back door and then gradually gain in influ-

ence - the classic "land and expand" scenario. Linux proponents argue that a key reason for this is the system's undoubted technical prowess - once you've experienced it in one context, the temptation to extend it elsewhere is insurmountable. When it comes to comparisons with Microsoft offerings, it is Linux's reliability which appears to win hands down. 'It's a much more stable environment once it's up and running: there's no need to keep an eye on it,' says a spokesman for Guildsoft - the company which recently took on responsibility for the TurboLinux distribution in the UK. 'Customers are saying to us: "We need to be able to do what we can already do with NT, without having to act as a permanent nanny."'

The ultimate advantage of Linux, though, is its freedom. Although the 'free' in 'free software' doesn't actually refer to price, the availability of Linux distributions and updates for download without charge can be very attractive. 'If you can save 30 per cent of your budget by not having to buy the software,' MacSween points out, 'there's more to spend on development. It's a question of asking: where do you want to spend?' Far more important, as both free software/open source proponents and commercial Linux distributors agree, is freedom as in liberty. Not surprisingly, the definitions of liberty are a matter for debate. The Free Software Foundation says users should be free to run, copy, distribute, study, change and improve software, while more marketing-sensitive adherents like Eric Raymond favour the re-labelling 'open source' and promote a definition which permits a wider variety of licences. Semantics and philosophy apart, the practical technological case is agreed: open access to and distribution of the source code - and the freedom to co-operate on improvements - result in better, more reliable software. Most Linux users are simply content to benefit passively from the superior software this much-debated freedom produces. With the kernel regularly upgraded and reviewed, you won't have to wait years for an enhancement or bug fix.

Some still see Linux's freedom as a potential hindrance to its wider adoption. Walden at HP, for example, says many of his clients will continue to be wary of making the investment until the Linux distribution business model changes into a more "comfortable" mode. 'If I were an IT director deploying mission critical applications, I'd need a more solid technical road-map - and I'd quite like to pay for it so I'd know who to sue if the thing went wrong. IT directors don't like an atmosphere of sudden upgrades.'

For Linux to succeed as a mainstream enterprise OS, he claims, 'the anarchy which makes it exciting needs to become more solid and concrete. When there is enough control to give you comfort, but not enough to lose the excitement, the market will explode.'

GB Direct's Fisher is more sanguine, seeing the current

'WHEN THERE IS ENOUGH CONTROL TO GIVE YOU COMFORT, BUT NOT ENOUGH TO LOSE THE EXCITEMENT, THE MARKET WILL EXPLODE.'

Walden, HP

Planet Online

Planet Online is the hosting power behind Freeserve, among several other ISPs, as well as numerous corporate organisations. It began experimenting with Linux from its inception in 1995. 'The start of Planet happened at around the same time as Linux,' says operations director Peter Mathers. The company now uses Red Hat Linux for all its generic Web services (user groups, chat, mail and so on)

aimed at business users and virtual ISP customers. However, in its main activity as a host or co-located service provider for customers, it continues to offer Microsoft and UNIX (primarily Solaris). Mathers explains this is because customer demand in this area has not yet shifted to Linux. 'There's certainly a possibility we'll offer a Linux service if the market asks for it.'

Given its lengthy in-house development experience with the operating system, Planet

Online will certainly be ready as and when the hosting market does move in this direction - such is its Linux pedigree that the company can even lay claim to the development of part of the kernel. 'We were responsible for a networking file. We needed something for an internal project and then fed that back into the community,' Mathers says. In its early days, he admits, there were teething problems with the system in terms of its performance and availability at server level. But

its high availability at the desktop level ('crashes were almost unheard of') and low cost persuaded the company to persevere. It opted for Red Hat for its perceived respectability and reliability. 'It was one of the first products to give us packaging, stability and the guarantee it would still be around. Red Hat had also addressed some of the weak areas of the system.'

Another plus point of staking the Red Hat route is the company's commitment to

develop across post-PC, handheld and set-top devices. Mathers notes with approval Linux's ability to re-invent itself on platforms as disparate as clustered servers and PDAs. 'We've got to have that flexibility. Customer demand changes year on year - if we had to change the operating system every time we'd soon fall behind. The point of Linux is we can use and re-use our development work across different products.' Contact PR Helena McCarthy: 07930 335 355



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Hill House Hammond

Part of the Norwich Union, Hill House Hammond is a general insurance intermediary with some 240 branches nationwide, typically based on the high street. Unlike much of its competition, the insurer has no intention of changing this model, claiming it 'still believes strongly in face-to-face contact with customers'. Nonetheless, it also runs three large telephone call-centres and is also extending its Web

site to offer customers a third sales and information medium.

Head of media, Alex Lovesey, explains that when the company decided to upgrade and extend its long-standing Pick System, it had two main criteria. First, the new system had to provide real-time links between the head office, call centres and branches. Secondly, it had to be able to run applications in the branches themselves. 'We put together a two-year business plan we called Rock'n'Roll. The plan was to get the sys-

tems rock steady so we could roll forward,' Lovesey says. Most of the development work was complete by the second half of 1999. 'We were one of the first financial institutions to use Linux applications throughout our operation.'

Hill House Hammond was also impressed by the speed with which the Red Hat system went in - in some branches the process took 'under 10 minutes as opposed to the usual six hours. When you multiply that by 240 that's a lot of time and money saved.' Lovesey says

the cost-effectiveness of Linux was a major consideration for the insurer - particularly given its continuing commitment to the expensive bricks and mortar model. But another clear boon of running the system across the enterprise is the ease with which the branches can communicate with the central accounts, direct underwriting and IT departments - allowing the latter to perform remote problem-solving. 'The whole thing has become much more streamlined.' When it came to making the final deci-

sion to go with Linux, Hill House Hammond was strongly influenced by the weight IBM is putting behind the OS. It already runs IBM's Netfinity 3000 servers across its branches as well as an RS/6000 SP2 in the head office. But she claims the Linux system co-exists happily with Microsoft applications running in the call-centres as well as its legacy Pick systems.

Contact: Alex Lovesey: 0117 929 2906.

situation as a chance for organisations to regain control: 'No Linux company can ever put the squeeze on customers like Microsoft can. No customer choosing Linux is ever going to get stiffed. There's no lock-in. That's crucial from a business point of view. Businesses can customise any "off the shelf" distribution or open source program - either to stretch it beyond its original source code, or to take away functionality, which is sometimes more important.'

Red Hat's Tenwick agrees: 'Linux puts the choice in people's hands,' he says. 'If a new market paradigm comes along, or the business changes, they can move quickly. It's all about choice and freedom.'

The driving force

Despite the recent heavy financial investments, the main motivation for programmers' contribution to the enhancement of Linux and the numerous other free software and open source projects remains the same: peer recognition. Seemingly, it makes no difference whether they are on a company payroll or are paying with their own time to get the improved product they want. Indeed, the practice of reaping hard cash rewards from this joint technical achievement is still frowned upon in some circles. And, as MacSween points out, the man who began this story sticks resolutely to the original share-and-share-alike philosophy. 'Linus Torvalds is not a rich man,' he says.

Moreover, because so many of the 'competing' distributions were started by the original band of 15 or so Linux kernel engineers - described by one source as 'Torvalds' disciples' - there is a strong sense of continuing camaraderie between them which defies traditional market thinking. 'They rely on our developers, and we rely on theirs,' says the TurboLinux UK spokesman. While there is one common enemy, he maintains, all competitive instincts will be channelled into tackling that. 'Really it's just a case of taking market share from Microsoft.'

'In all honesty the distributions tend to be fairly similar - if something's good they'll all adopt it,' adds MacSween. 'If there are differences, they come in the utilities surrounding them, but underneath the hood they're all pretty much the same. Most companies will make a decision on a particular distribution based on local support, or who the local Linux guru is.'

But signs are growing that this early cohesion between distributions is beginning to give way to the forces of the market. 'Matey is not the right term for our relationship,' says Red Hat's Tenwick. 'We're all brought together by a common focus - a passion for open source technology - but within that clearly individual companies believe they can successfully grow their own brands.'

That Red Hat has been putting this separatist philosophy to good use is beyond dispute - it claims to have 65%

of the worldwide Linux market, though this figure is disputed in some quarters. 'But our relationships and alliances are second to none and we have eight or nine of the original kernel engineers working at Red Hat. They are some of the best engineering talent in the world.'

Tenwick predicts that the Linux market will eventually evolve into 'one or two major global brands, and then some niche or market-specific players.' Indeed, he believes that the focus of the new market will eventually move to incorporate the entire open source area, leading to the mainstream adoption of an entirely new corporate computing paradigm. 'With the growing number of open-sourced applications and databases,' he says, 'there's a lot more to open source than Linux.'

Granted, but it looks as if Linux will be the major catalyst for free software and the open source model finally gaining respectability and, who knows, eventual predominance. And with the networked environment set to be progressively less rigid and more ubiquitous than the one we currently inhabit, the future looks inviting for a more open and co-operative modus operandi.

The moot question of the viability of Linux on the corporate desktop stands to be side-stepped when high-speed networks combine with cost savings to make serving applications across platforms irresistible. 'Application-specific servers are going to be really an explosive market opportunity in the next two years,' according to Joe Ferlazzo of leading analysts Technology Business Research, 'and Linux is probably going to be the OS of choice on them.'

Another tip comes from Linus Torvalds' current choice of day job, working on the Crusoe processor - a chip designed for net devices and ultra-light mobile PCs. The importance of embedded systems to the future of Linux has been forecast for some time, and 2000 is seeing a rush to market. According to Daniel Nilsson, director of sales and marketing at On Channel, hardware manufacturers are favouring Linux because they dislike commitment to a single vendor. 'Linux can be the standard used to connect appliances,' he says. Meanwhile, embedded technology specialist Cygnus, now part of Red Hat, is planning for post-PC Linux with its specification of EL/IX, an embedded Linux API based on the POSIX standard. 'Linux's portability makes it a natural for embedded systems,' says founder Michael Tiemann.

However the future shapes up, it seems clear that Linux will play a major and growing role. But, perhaps, not necessarily an over-obtrusive one. After all, fascinating as many people find it in itself, technology exists to serve, allowing us to do what we want to do, more easily, more quickly and better.

As Linus Torvalds puts it: 'Operating systems should be invisible. People should take them for granted.'

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“Free” is a provocative concept for many people in business. *LinuxUser* asks four key industry players if there really can be such a thing as a free OS



Free for all?

LinuxUser: Is Linux really a lower cost option for businesses, or are there hidden costs in adopting a “free” OS?

Scott Handy: A Network World survey found that 78 per cent of people using Linux in business are choosing to buy it rather than download it for free. They do that to get support from the distributor, as they would with any other operating system. That shows that the issue of the cost of purchasing the operating system is a very minor component in people's decisions, and they realise that the major costs of solving the business problem continue to reside elsewhere.

The operating system is a minor piece of the overall solution when a customer is buying hardware, software, applications and services. Whatever operating system you choose, you will still have either pay a consultant or use your own time to get your application to do what you need it to do.

Ben Laurie: The costs of running a free operating system definitely aren't hidden; they're the same kind of costs with adopting any operating system. But many companies put up illogical barriers to the benefits – both financial and technological – of free software and open source. In some places if you want to run a UNIX you have to run a Sun or

Who's who

Scott Handy is the Linux Solutions Marketing Director of the IBM Software Group

Ben Laurie Technical Director of A L Digital Ltd, is best known for his work on Apache, Apache-SSL and OpenSSL.

He is a member of the European Working Group on Libre Software

Malcolm MacSween is Managing Director of Enterprise Management Consulting

Colin Tenwick is European Vice President of Red Hat

'The commercial success of Linux has caught the attention of the independent software vendors and developers. The amount of new applications being developed for Linux is phenomenal.'

Scott Handy, IBM Software Group



an HP. It's a ridiculous way to proceed, and it leads to huge unnecessary capital expenditure. Senior management just don't get it – they think that if you pay for it, it must be better. It's demonstrably not well thought through. There are, of course, valid structural reasons why adoption is slow in big firms. For them, changing anything can be incredibly painful. I mean, they're often still running mainframes! Newer, more nimble companies will gradually start pushing out the slower, older ones – that's what always happens – and the newer, more nimble ones will already be using free software.

Malcolm MacSween: In the traditional model, costs are incurred in two places: getting a solution working to begin with, and in licence fees for each time the solution is reproduced. The costs with Linux are really the one-off costs. You construct one working implementation which then gets duplicated and distributed to branches. With Linux, you pay for one brick and then you can build a whole house out of it. At its simplest, the more people and branches you have, the more cost savings you'll see. Even the implementation costs are generally lower than with a proprietary type of operating system.

With Linux, as with the other versions of UNIX, it is much easier to look after boxes in multiple locations.

'Linux isn't being developed by a bunch of 18-year-olds with blue hair in garages. Significant amounts of code... have been developed by very professional, diligent, high quality engineers.'

Colin Tenwick, Red Hat

That definitely reduces the costs. We look after 22 boxes for one company, all around the UK, and we rarely make any site visits – it's all done remotely.

People like us use Linux because we know that when it's configured correctly it does work and we can walk away, and when it does need maintenance and attention, it is much easier to work with.

Colin Tenwick: In a classic sort of environment the majority of costs are in the training and maintenance and so on, not in the initial capital expenditure. But there are different costs associated with different ways of working. Developments like thin client architecture will deliver new economies.

We believe that the future is a server-based architecture accessed by a thin client, where your expenditure will be concentrated more into people costs and network costs. Organisations will use thousands of devices to communicate with their customers and business partners, and the server will need greater functionality. A lot of the work we're doing in the open source area is aimed purely at that – ensuring that there is an open source platform



which competes head-to-head with Microsoft or Sun, and is scalable, from the smallest device, such as a set-top box or a Webpad-type machine, through to e-commerce servers. It's the most functionally rich way of doing things – and it's going to be the most economic for users.

LU: The innovation and refinement of Linux and open source/free software has depended a great deal on unpaid effort. How can businesses be sure that adequate progress will be maintained?

CT: Linux isn't being developed by a bunch of 18-year-olds with blue hair in garages. Significant amounts of code which form the distributions, elements like the X Window System, Samba, and so on, have been developed by very professional, diligent, high quality engineers. Ben is a good example right here, with his involvement in the Apache project. The pace of contribution is expanding as more enterprise organisations come into it. As companies like SGI and IBM get involved, there's no degradation in the quality. As long as the kernel maintenance groups maintain their very strict standards on quality of work, and companies like us continue to put increasingly large amounts into the quality assessment cycles, we'll see not only the innovation expanding but also the quality.

SH: Is Linux sustainable? Absolutely! You only have to look at the constant stream of patches that volunteers are making available on the Internet, meaning that developers are able to get the freshest releases every day. Business users will benefit directly from that innovation, even though they'll be using a production release, where the distributor has selected the best and most relevant patches and maintained them.

There's another answer, too – that what will sustain an operating system is applications. The commercial success of Linux has caught the attention of the independent software vendors and developers. The amount of new applications being developed for Linux is phenomenal.

BL: To me, there's no difference between someone developing voluntarily and a company paying someone to do it. Individual volunteer programmers are still paying to have development done – they're just paying in time instead of money.

I got into the free software movement when I did a workaround to get Apache running on SCO UNIX. Until then I'd been very sceptical about the whole thing – why work on stuff and give it away? Now I know that if give away some of my time I get back 20 times as much of other people's time.

CT: We did some analysis when we floated – we had about 280 applications ported to Red Hat. We now have 3000, in nine months! That rate of uptake is happening because of the different business model, predicated on open source, on best of breed, on a total cost of ownership in terms of the acquisition of the technology. People are voting with their feet.

SH: With regards to the core maintenance of Linux, the core group of kernel hackers are now being paid by one of the Linux distribution partners, which enables these people to devote themselves full time to Linux. They don't have to worry about where their salary is coming from. Even Linus himself is working on portable Linux with Transmeta.

MM: Yes, I agree it's very sustainable. We've already reached



'The end result of open source is that **everyone** can get involved and learn from it and understand it as a model to aspire to. We use open source software simply because it is the **best product** in most circumstances.'

Malcolm MacSween, Enterprise Management Consulting

and surpassed the necessary critical mass. People in higher education – both students and lecturers – have, in a sense, been paid to contribute into the movement for a long time now. And now, as more people are getting involved, it is much more likely to continue.

What goes on in higher education soon makes its presence felt in the commercial world. Contacts of mine in universities say that they're now aiming for a 50/50 split between Windows and UNIX, with Linux as the UNIX of choice not just for reasons of cost but also because it incorporates a lot of the best ideas from the other Unices.

It's rather like UNIX in the early days. People left college knowing UNIX inside out and started implementing it in commercial situations. That's what we're getting again with Linux and open source, and that gives you a skilled resource and very high-level people.

LU: Won't the tension between people who are making money and those who aren't, but are contributing just as much, cause the open source movement to lose its



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'The whole point about open source is that it **empowers** the customer to be in control of their own life. And for that reason I don't think there's any chance that it will ever be overshadowed by proprietary software.'

Ben Laurie, A L Digital

valuable 'community' input?

SH: The impetus behind the free software movement wasn't money, and it's still not. The core development team is 10 people who rely on the people in the next tier who've contributed useful patches that fix problems. Just the status of being in that next tier of people is what drives the whole thing.

At IBM, we have to work on the basis of technical merit the same as anyone else. We have hundreds of people, perhaps even thousands, contributing to open source projects. It's regarded as a huge honour within the technical community of IBM to be working full time on the journaling file system project, for instance. That's what drives this community - it's not a financial thing.

MM: The pool of people who are skilled in Linux is definitely growing all the time. Had it been five years ago and a couple of key people had stepped out of the project, that might have been a problem, but so many people are involved now it wouldn't be a problem. I agree with Scott: top quality developers are not motivated by money. They like to code. It's exactly the same as a

musician or artist who has a particular skill: if they can have a job doing that they will, but the quality of their work will remain the same regardless because that is their passion.

It would be hard to imagine people like that being subverted by money. They may have disagreements with each other, but everyone realises that the end result is to produce really high quality code.

BL: Well, I think there is tension to some extent. When Red Hat's directed share programme was only applied to Americans, that created a lot of bad feeling, particularly amongst people like me who aren't American! VA Linux, on the other hand, went to great lengths to make sure that everyone who should be rewarded was.

The tension is simply because a few guys with money in their pockets are making large amounts off the back of people who have been doing stuff as a co-operative effort. Don't get me wrong - I don't think there's anything particularly wrong with doing that! But they've got to share that with people who got them where they are.

LU: How do companies benefit from contributing to open source projects?

SH: We're involved because we'd like Linux to succeed. Our customers are interested in it, and when we contribute to open source projects there's a goodwill that goes with that. It keeps us at the forefront of Linux development so we can provide the solutions that meet customer needs.

CT: Red Hat has about eight of the top 12 kernel engineers working on things which are for the good of everybody. Other major companies, including Oracle, SGI, Computer Associates and SAP, also have resources dedicated to Linux. SAP has its own Linux labs now and everything it's developing is going to open source.

SAP wouldn't say its core business is drivers to run on Linux. However, it's prepared to commit resources because its core business is the application, and if it contributes that to the open source area, everybody can use it and it gets the innovation and rapid development it couldn't do unless it put about four times as many engineers on it.

Companies are starting to dedicate engineers for specific areas, which produces a very high quality engineering team - as long as processes are in place for the recommendation and adoption of the technology.

BL: Developing co-operatively pays off. If a company has got a product that needs work on it, and they have people capable of doing the work, they can either pay to do it all in house, or they can take the open source route and share that work with other people who also want that product. If they go the open source route, they can both reduce their own costs and benefit from a better product.

LU: Is Linux going to become just another platform for proprietary software, with closed source commercial applications muscling out open source and free software offerings?

MM: As a consultancy, we have to judge open source on its merits. We're running a business and our customers are running businesses, so we can't afford to take an idealistic attitude. If there's a situation where open source offerings are not the best product available and there's a closed source product ported to Linux that does the job better - a very specialist banking application, for instance - we would have no problems recommending that.

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But the end result of open source is that everyone can get involved and learn from it and understand it as a model to aspire to. We use open source software simply because it is the best product in most circumstances.

SH: Linux is a success in its own right. That success drives the independent software vendor applications, and that drives purchases. If we didn't think there was a long-term viability there, we wouldn't be investing in it. Long-term viability of an operating system is important to customers. All the indicators are that Linux is on a steep acceptance curve, and we're ramping up to that capability. We've recently got data back that indicated what would accelerate Linux even faster than the rate that we're seeing, and that was applications. A lot of the activity you're going to see from IBM is going to be around motivating business partners and application developers to continue to bring applications to Linux.

CT: The important thing to concentrate on is the way the whole open source approach is fundamentally changing the way in which companies look at delivering value. It's about sharing, it's about people collaborating – best of breed working together. It's about offering unprecedented volume and quality of innovation. It's about making the best things available to everybody for them to use.

Intel recently put US\$29 million worth of code into open source; you're talking about SGI doing the same thing. If you'd said 18 months ago that these major pillars of the world-wide technology community would be adopting open source to anything like this degree people would have thought you were absolutely mad. And the reality is that they are now doing this because of the benefits they can see and because of the momentum there is – from users, from customers, from people.

SH: Fundamentally, everything depends on what value is offered and what people are prepared to pay for. Linux provides a standard base for applications. The Internet has been growing on standards, and we can see Linux becoming the reference platform, whether the applications are running on Linux or hosted on another platform such as AIX. There's potential for interchange.

That's where you get critical mass – the user cares most about whether their application will run on the platform.

BL: My feeling is that proprietary applications will never overshadow free software. There are two reasons for that. First, free software is demonstrably better than proprietary software. People who used to do everything in a proprietary way are now moving towards openness. IBM is a good example, dropping its own Web server in favour of Apache about two years ago, and Sun has started to do similar things, like giving the reference implementation of Java servlets to the Apache Software Foundation.

Secondly, the whole business model of the people who are getting money for writing the software is that it's open. You can see the growth of it. I think it's just a "natural" state. It's pointless having multiple proprietary versions of the same thing. People can't maintain them, and that's becoming increasingly obvious. People have been paying a huge amount of money, then paying more for support, and the bugs don't get fixed anyway!

The whole point about open source is that it empowers the customer to be in control of their own life. And for that reason I don't think there's any chance that it will ever be overshadowed by proprietary software.

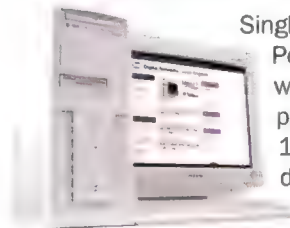
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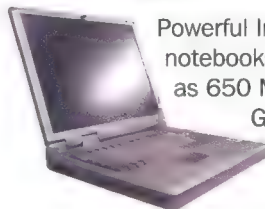
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Help when you need it

One of the chief concerns for organisations considering Linux is whether sufficient support and training will be available. Because no commercial organisation owns Linux, there's an anxiety that the level of support may be inferior to that available with proprietary software – for example, that users can't simply pick up the phone to a manufacturer's help line. A quick glance at the range of options begins to set the mind at rest.

Whether the need is for 24-hour generic Linux expertise via telephone and email, professionally certificated training, reliable documentation online or on paper, advice from fellow users, or even direct consultation with the people who write the software, there's an abundance of help to suit every budget and level of ability.

Support from Linux distributions, retailers, consultants and support specialists aims to emulate the best aspects of the assistance provided by proprietary software companies. And in the monopoly-free commercial environment surrounding Linux, with well-qualified suppliers always ready to fill a vacuum, the free market incentives in favour of proactive customer care are exceptionally strong. Training, meanwhile, is available from a diversity of established sources, with a number of bodies ensuring credible certification.

What's more, thanks to the freedom with which it is produced and distributed, Linux is able to give its users an extra dimension which proprietary products cannot match: a vibrant culture of mutual assistance between users and direct access to the resources of the group that produces the software.

Lean on me – the traditional route

Although Linux can be downloaded free off the Internet, most business users like to have the comfort that comes

There's plenty of help around for new and experienced Linux users – if you just know where to find it. **Steve Cotterell** introduces the range of support and training options

from buying a boxed version of Linux from one of the major distributors. There being no such thing as a licence fee for Linux, the major distributors derive their revenue mainly from support, consultation and training services. Simply paying the price for a boxed set typically entitles you to a reasonable period of support by email to help you install the product. Distributions also have gigabytes of tips, FAQs and HOWTOs freely available on their Web sites, as a complementary service to standard boxed set purchasers and free downloaders alike.

Like most of its competitors, the market leader Red Hat offers an array of paid-for options including 'incident support' and configuration support for tasks which fall outside of installation assistance. For organisations who require complete assurance, it also offers a 'Platinum' contract which provides a Linux network with 24-hour support.

Even retailers are now adding value to their propositions by bundling support with purchase of Linux distributions. For instance, Bristol-based sellers of Linux related systems, software and books LinuxIT, for example, includes 30 days' free email support with most of the Linux products it sells, and offers additional support packages including configuration of agreed applications, networking, Internet access and software maintenance.

The number of third party specialists with whom one can take out support contracts is increasing. Most prominent among these globally is Linuxcare. This San Francisco-based company – which recently opened a UK office – has built a reputation based on its global call centre support operation, and aims to be the benchmark provider of Linux support and services.

Barry Cochrane, Linuxcare's UK general manager, says: 'Because we're vendor neutral, we can offer customers a complete Linux support and services solution, no matter

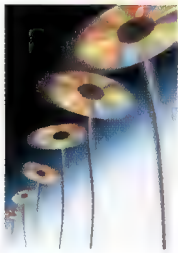


what systems and applications they're using. This marks a major distinction in the way that service content and delivery have so far emerged.'

Take control - do it yourself

While paid-for support is valuable, it will be worthwhile sooner or later for people working on Linux systems to start researching the answers for themselves, either to save money or to minimise the delay of consulting a third party. Whether you need to glean just the minimum knowledge to get something working fast, or you want to build up a more thorough understanding, the best way is usually to RTFM, (or 'read the manual', as my maiden aunt puts it). You don't even have to go on the net. Linux distributions come heavily documented with manual pages, HOWTOs, quick reference guides, READMEs, example configuration files, you name it - just root around in the /usr/doc directory of your Linux installation, and you'll probably find what you need.

Of course, you'll always find the freshest information on the net. For help with any of the huge amount of free



Whether you need to glean just the minimum knowledge... or you want to build up a more thorough understanding, the best way is usually to RTFM, (or 'read the manual', as my maiden aunt puts it).

software and open source applications available, the best place to start is always the project's home page. As well as the latest versions of the documentation and every release and patch going, it will typically contain development news and links to sources of help. For information on the Apache Web server, for instance, www.apache.org is always the place to start looking.

If your business depends on the most cutting-edge features of an open source software package, you may find what you need in the forum where the developers discuss their work. While simply reading the mailing list archive usually tells you what you need to know, if you have a valid question or suggestion you'll find the developers helpful. You could have an influence on new versions and even contribute directly to development. Try doing that with proprietary, closed-source software products.

As a complementary service to the home sites and development groups for particular packages, many expert users offer their own friendly, conversational help with particular aspects of system configuration. Such sites tend to provide quality information, since their owners' credibility in the industry depends on their accuracy. A good example is David Ranch, who maintains an excellent cross-distribution configuration guide called TrinityOS (www.ecst.csuchico.edu/~dranch/LINUX/index-linux.html). Like many of these volunteers, David Ranch also contributes to the Linux Documentation Project - a globally-mirrored library of manuals, HOWTOs and other reading matter in their most up-to-date versions, covering

topics such as installing, using, and running Linux, and suitable for a range of knowledge levels. Guides offered include *The Linux Users' Guide*, which assumes no previous experience of Linux and covers all aspects, from beginning your first login session to using complex tools.

Also available is the *Installation and Getting Started Guide* for PC users who want to install and use Linux. This online book assumes a basic knowledge of PCs and operating systems like MS-DOS, but nothing about Linux or Unix. Another manual, suitable for beginners as well as more experienced users, is the *Newbie's Linux Manual* by Laurence Hunter. This can be read online or downloaded for printing out.

Words in their printed and bound form remain a crucial source of authoritative information, with established open source publishers like O'Reilly leading the field. Book suppliers' Web sites are excellent sources of Linux guides, and one of the top matches on any search will be *Running Linux* by Matt Welsh. Widely considered to be worth a read for new users, this guide to installing, configuring, and using Linux covers the kernel up to version 2.2.1 and is particularly suitable for people with high technical aptitudes who are ready to experiment with their systems. The new third edition features co-author Matthias Kalle Dalheimer of KDE fame.

UK-based IT book specialist, Computer Manuals (www.computer-manuals.co.uk), caters for all levels of Linux expertise with over 220 Linux books on its site. And the click2learn.com site's catalogue contains 94 Linux-related titles, including a number of the 'Teach Yourself' variety. These include *Teach Yourself Linux in 10 Minutes* which, at 224 pages, sounds just a little too good to be true. There is even some computer-based training beginning to appear for Linux. For an interactive introduction to some basic functions, 'Viewlets' provide a novel, ingenious way of delivering lessons using JavaScript modules that actively show you how to do something, helping you to remember the techniques demonstrated. There are links to several sites offering Viewlets on Linux-related topics for you to use, free of charge at www.viewhow2.com/software/os.html.

Group therapy

Another valuable route for locating expertise - without committing yourself to the expense of support contracts - could be to get in touch with your nearest Linux user group; see www.linux.org.uk for contact and many other useful links.

You could also subscribe to one or more Linux-related newsgroups, of which there are more than 100, offering discussion and advice on various aspects of Linux. www.linux.org/help/usenetlinux.html is a good place to start. If you have a problem, always look at the appropriate FAQs first, then search the newsgroup archives (an easy way to do this is through www.deja.com). You'll probably find your answer there but, if not, post your question to the newsgroup or ask in the user group and people will mostly be genuinely pleased to try and help.

If you prefer to use IRC, there are several #linuxhelp or #Linuxhelp channels on EFNet, Undernet, DALnet, irc.linux.com and BeyondIRC. As for other #Linux channels you should check out first if they answer 'newbie' questions.

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Of course, there's no guarantee that you'll get the right answer to your questions in these informal groups of users so you should be careful when following their advice. On the other hand, how often are you given misleading information by commercial organisations which should know better?

Getting the knowledge

Many employers and clients appreciate the reassurance that comes from formal training and certification, and the options currently available recognise that Linux is currently used mainly as a client-server rather than a desktop system. There are two approaches to delivering training: distribution-specific and vendor-neutral. The former approach is adopted by Linux distributors like Red Hat, which offers its own Red Hat Certified Engineer (RHCE) courses which concentrate on the Linux version it markets. Its course covers installation, configuration and administration up to advanced level, the X Window System, standard networking services and systems administration and integrity. There's a practical exam at the end of the course.

'It's essential for all IT professionals to be given the necessary training and certification,' says Ian Cole, Red Hat Europe's professional services and finance director. 'With the introduction, last year, of the official RHCE qualification for technical professionals, we can provide intensive hands-on training and certification on Red Hat Linux.' Red Hat has a number of training partners, such as Global Knowledge and Siemens, established throughout Europe. Global Knowledge's RHCE Rapid Track Certification course lasts five days, including the exam, and is held at centres in London, Manchester, Belfast and Glasgow. LinuxIT, meanwhile, offers customised on-site training and RHCE courses in conjunction with external training companies, based on openly available training materials.

Vendor-neutral training organisations aim to equip their students with the knowledge to administer and program any machine running any shade of Linux or UNIX. Because Linux is an implementation of UNIX standards and is, in many instances, running alongside UNIX these companies consider that students should understand both systems.

The Linuxcare University training network provides educational programmes and materials for Linux and open source technologies, and prepares students for Linux Professional Institute (LPI) certification. Linuxcare is one of the seven major sponsors of the LPI, a non-profit organisation concerned with defining vendor-neutral standards for expertise in Linux. Over 140 training centres are registered with LPI and listed www.lintraining.com – a good source for information on training events, news and links.

Linuxcare recently announced its first training partnership in Europe with an agreement to train six specialists from UK network security and connectivity software distributors Unipalm. The six will go on to form a mentoring panel to offer Linux training to the public.

The other major worldwide certification programme, and the first to market, is offered by Sair Linux & GNU Certification, well supported by the Linux community and backed by such luminaries as Richard Stallman and Eric Raymond. Sair aims to be the most objective, detailed, and comprehensive certification scheme available, and has



Lack of support and training is no longer a valid excuse for IT managers to dismiss a Linux-based solution in favour of a "safer" but inferior alternative.

acquired influential supporters such as Compaq, who are using Sair Linux & GNU Training Material as a base to develop its internal ASE program (see Q&A with Sair's UK Director Allen Bellinger on page 41). Training is provided by third party organisations rather than Sair, which sees its role as codifying the "knowledge matrix" required for the Linux professional, and administering certification exams. Although Sair is a private company, it makes clear its intention to direct profits into free software projects.

Aside from the global players, the UK already has some well established Linux training providers. GB Direct provides some public training courses for individual users, but the bulk of its clients are corporate customers requiring on-site training at their own premises. It offers a set of over 40 training modules which are bolted together to provide bespoke courses (which can include exams) for the client. GB Direct also offers one-day overview seminars for larger groups. Its rates for these seminars are lower and, says Dave Fisher, GB's head of business development, 'there's been a very healthy demand for the Linux technical and commercial opportunities overview seminar from corporate financial directors and IT managers.'

GB Direct is involved in the Linux Training Materials Project (www.linuxtraining.co.uk) whose objective is to make high-quality training materials available to professional Linux training providers, free of charge.

Peace of mind

Our whistle-stop survey seems to indicate that lack of support and training is no longer a valid excuse for IT managers to dismiss a Linux-based solution in favour of a "safer" but inferior alternative. Whether you entrust your organisation's Linux support to a commercial organisation, or choose to upskill yourself or your staff through formal training or by reference to the myriad sources of information available on the net, you can rest easy knowing that the Linux world is famed for its expertise and its goodwill to other users – corporate or individual. That's something to reflect on next time you're left hanging on a "helpline".

Start points

Red Hat support www.redhat.com/apps/support/

LinuxIT www.linuxit.com

Global Knowledge www.globalknowledge.co.uk

Linuxcare www.linuxcare.com

GB Direct www.gbdirect.co.uk

Linux Training Materials Project www.linuxtraining.co.uk

Linux Professional Institute www.lpi.org

Lintraining www.lintraining.com

Sair Linux & GNU Certification www.linuxcertification.org

Linux Documentation Project www.linuxdoc.org

(There's a UK mirror at www.mirror.ac.uk/sites/www.linuxdoc.org)

Computer Manuals www.computer-manuals.co.uk

click2learn.com click2learn.com

Viewlets www.viewhow2.com/software/os.html

User groups links www.linux.org.uk/UKLinks.html

TrinityOS www.ecst.csuchico.edu/~dranch/LINUX/index-linux.html



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The Knowledge Linux training & certification

Take a tip from a cabbie: you won't get far without the knowledge. That's why we'll be having a training and certification section as a regular feature in *LinuxUser*, to discuss issues around training and certification and give you pointers to UK providers.

Sair Linux & GNU Certification – the scheme backed by the Free Software Foundation – is one of the two market-leading distribution-independent Linux certification organisations. *LinuxUser* talks to Allan Bellinger, UK Sales and Marketing Director of Wave Technologies, who own and manage Sair.

LU: Why are you promoting distribution-independent certification?

AB: Really, because the majority of Linux skills are similar. Having each distribution pushing into different areas is great, but the differences between them are still relatively slight. UNIX got diluted because there were so many different flavours. That fate is not in interest of the Linux or the user community. People want the freedom to switch from distribution to distribution and to avoid lock-in at all costs. If someone is certified in a distribution-independent way, they can make choices between the different distributions and exploit the full benefits that open source provides.

LU: Is there a real demand for certification yet?

AB: We're pushing on an open door. I spoke at a recent Linux exhibition, and people were saying: 'Linux is exploding, but there will inevitably be cowboys in this market. We want to identify who has the strong skills.' What drives this is the desire to fulfil the requirements of the user community.

LU: Can we live with diversity in the certification sphere?

AB: We want people to get certified, whether they use our materials or someone else's. It may even be in the community's interests for there to be different generic certifications. People can judge which best maps real-life requirements. The Linux Professional Institute and Sair are taking slightly different views of that, so whichever turns out to be most accurate should win. Open competition is in interests of the group.

LU: What's the current state of play of Linux training in the UK?

AB: The growth is probably something like six to nine months behind the United States, but the demand for Linux training certainly in the last 60 days has come up incredibly fast. A lot of that is because people are realising that Linux isn't just another UNIX, and that just diverting your UNIX skills straight into a Linux environment isn't going to work.

LU: What are your tips for people looking to get formal training and certification?

AB: Assessment is the best way of preparing for an exam. A trial test before you take an exam will show you what you need to work. Virtually everyone that goes for Linux certification will have prior experience, and that will be reflected within the results of the assessment test. Find out more about the SAIR GNU/Linux programme at www.linuxcertification.org

Selected Linux training providers

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Wave Technologies UK
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We want to build up a comprehensive list of Linux training providers. For a free listing, please email, theknowledge@linuxuser.co.uk

Free training materials!

LinuxUser is delighted to be sponsoring the Linux Training Materials Project (LTMP), producer of high-quality training materials for community use.

LTMP materials are designed to be used by professionals in delivering Linux training, and are released under the terms of the Linux Documentation Project licence.

The project is devised and produced by GBdirect, and to date consists of seven modules: Overview of Linux, Linux and Filesystems, Basic Shell,

Basic Linux Tools, Introduction to the vi Text Editor, Using X Windows, and Shared File Systems.

The first new module sponsored by *LinuxUser* focuses on Apache, the world-beating free software Web server.

GB Direct's Dave Fisher said: "We started the LTMP because we wanted to contribute some of our expertise to the community. We're very pleased that *LinuxUser* is supporting the project."

Maggie Meer, publisher of

LinuxUser, said: "Training is a crucial area for Linux, and this is a great chance for us to help make excellent materials available to the community free of charge."

Tip: The text of the lecture notes is distributed in LaTeX source code, which you can transform into a variety of formats for screen or print using the freely available LaTeX program and utilities like gs, gv, dvips, xdvip, lpr.

Find the Linux Training Material Project at www.linuxtraining.co.uk

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As Corel further boosts the credibility of the Linux desktop market with the launch of WordPerfect Office 2000, **Tony Smith** compares it to more established office suites and asks whether it's good enough to tempt Windows stalwarts to Linux

Let's Work Together

YOU HAVE TO HAND IT TO COREL, it's doing good work promoting Linux as an operating system for desktops. Quite apart from releasing a version of Linux which is more user-friendly than the current crop of distributions, Corel has tackled the key problem that Linux must overcome if it's really to rival Microsoft Windows: the availability of good mainstream productivity applications.

Almost every computer user's work takes place in a word processor, spreadsheet, presentation manager, drawing package or database – sometimes all five – and making Linux useful to ordinary users is all about bringing those tools to it. Corel's contribution is WordPerfect Office 2000, a suite of applications it bought from Novell a few years back.

However, Corel isn't alone in catering for desktop Linux users. Developer Applix has been offering its ApplixWare office suite for some time on a variety of platforms, including Linux. More recently, Sun bought up German developer Star Division and, with it, its StarOffice package. That too operates on different operating systems, with Linux just one among many. KDE, the eponymous developer of the KDE user interface, is also joining the office software arena with KOffice in the works. It will ship with KDE 2.0, due later this year.

The key question for all these packages is how well they shape up against Microsoft Office. Only by beating Office at its own game will any Linux productivity suite allow the OS to become a serious desktop alternative to Windows. With KOffice still some way off, we put WordPerfect Office, ApplixWare, StarOffice through their paces.

WordPerfect Office 2000

WordPerfect Office (WPO) 2000 is a typical office productivity suite. All the key components are here: a word processor (WordPerfect), a spreadsheet (Quattro Pro), a database (Paradox), and a presentations tool (Presentations). If there's one thing that appears to be missing from the standard line-up of applications, it's a drawing package. True, Presentations offers some basic drawing tools, but Corel really wants you to buy CorelDraw when it comes out later this year.

In addition to the main applications, there's a personal information manager called Central (actually, it's three separate applications – Address Book, Calendar and Memos, a to-do list manager), BitStream's FontTastic font system and PerfectScript, which allows tasks in all four key applications to be combined and automated. Rounding off the package are heaps of fonts and clip-art.

Unlike StarOffice's 'all-in-one, take over your desktop' approach, WPO is installed as separate applications, opened via KDE or Gnome's applications menu. The installation process itself is straightforward – just open the CD-ROM window and click on the setup icon. It's a fairly quick process but, that said, the first time you run an application, you'll have to wait while the application configures itself, so time taken to install WPO and start getting real work done is longer than you might think.

Once past the self-configuration routine, the applications reveal themselves to be remarkably like their Windows equivalents. That's not just in terms of the fea-

Word-Perfect Office

1 Presentations could be a contender alongside Microsoft Office's PowerPoint, but Corel needs to get speed and stability issues fixed first.

2 WordPerfect's spelling and grammar checker, and thesaurus neatly appear under your copy, making checks and selection of alternative words easy.

3 From icons to toolbars to menus, WordPerfect provides a very Microsoft Office-like look and feel, as do the suite's other applications.

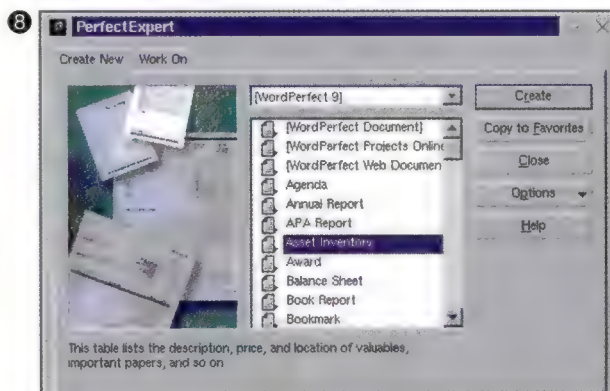
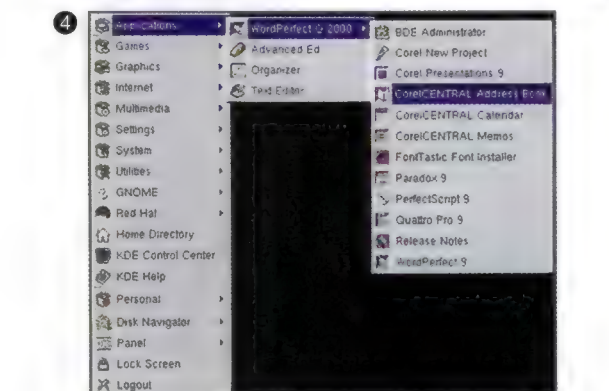
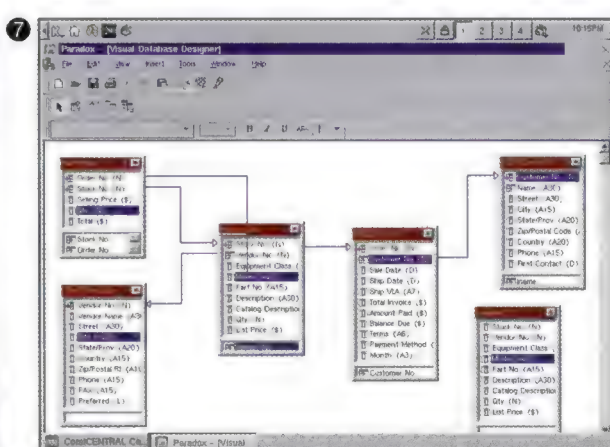
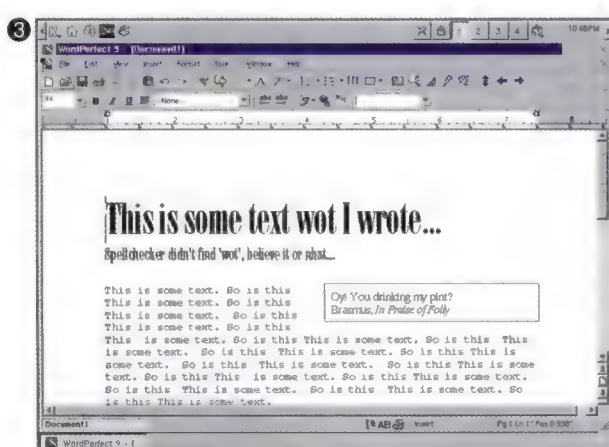
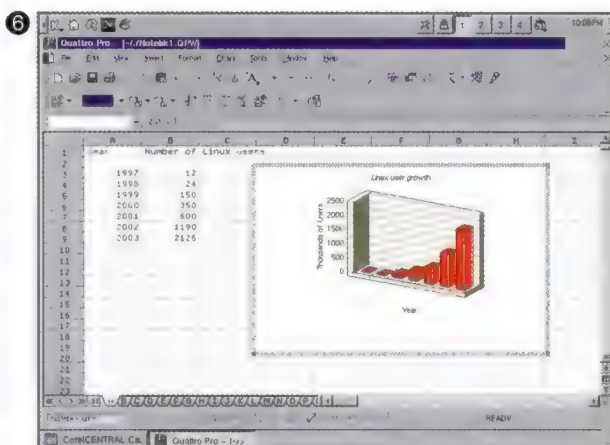
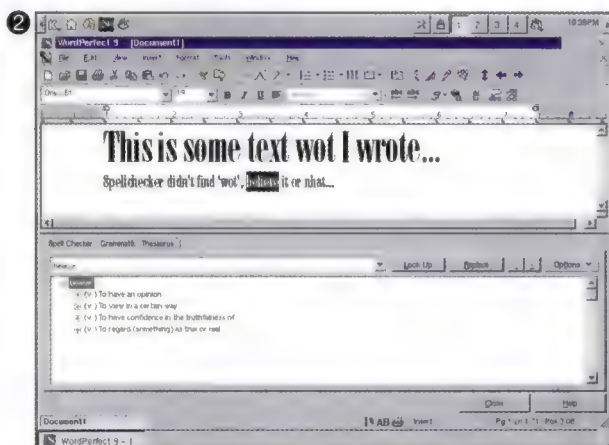
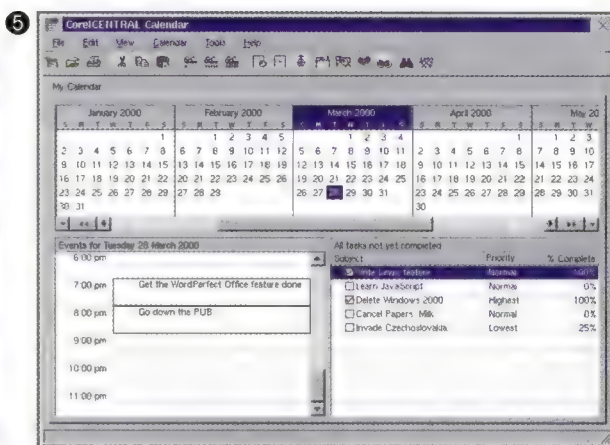
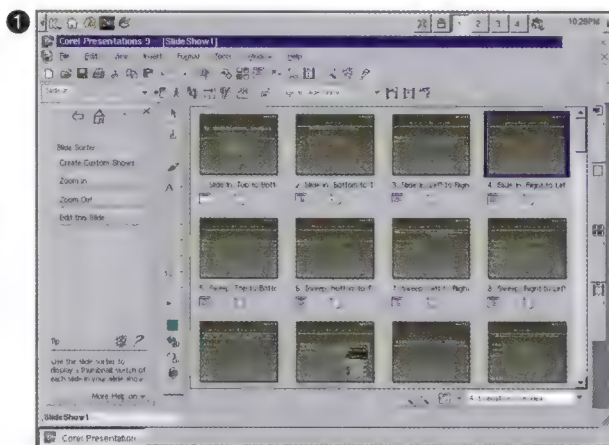
4 Corel Central offers all the basic functionality of a personal information manager but, as Linux's KDE desktop software does this already, you don't need it.

5 Quattro Pro is a solid spreadsheet tool, but a handful of idiosyncrasies and performance issues ensure it doesn't yet excel.

6 Paradox is a fast, feature-laden database management tool, and the Visual Database Designer makes the creation of complex systems much more simple.

7 WordPerfect Office is installed as a series of standalone applications accessed through Linux's main menu - so there's no desktop hogging with this suite.

8 WordPerfect Office's many document creation Wizards, for all the suite's applications, can be accessed through a single easy-to-use interface.



ApplixWare 4.4.2
£68
Applix
Web: www.applix.com

Corel WordPerfect
Office 2000
£137.59
Corel
Web: www.corel.com

Sun StarOffice 5.1
£FREE
Sun
Web: www.sun.com

• Look out for
KOffice
ETBA
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tures they offer, but their look and feel. In fact, grow a window so it covers the Linux desktop features and you really wouldn't know you weren't working on a Windows 98 machine. True, this makes it easier for users to move from one OS to the other, but it doesn't encourage users to get to know how Linux operates. It might also make users question the any need to move to Linux in the first place – if it looks exactly like Windows, why not run the Windows version?

The Windows styling comes about primarily because you are in fact running a Windows application. WPO 2000 operates on top of Wine, the free implementation of Windows on Linux and Unices and while Corel reckons users won't notice the performance drop, I found it quite slow to respond. That said, the version of WPO tested was a pre-release version, and the final release, without all the error monitoring code and tightly integrated into Corel Linux, is undoubtedly going to be a different story.

As for the applications themselves, they're a powerful collection of productivity tools. WordPerfect is pretty much the only solid competitor to Microsoft Word, and continues to keep up with its rival. It's perhaps not so fully crammed with features, but what it's missing is fairly esoteric – 80per cent of users use only 20per cent of the facilities, after all – and I had no difficulty bashing out a series of standard documents. We particularly liked its 'live preview' facility, which shows exactly how, say, a font will look while you're choosing it.

The same goes for Quattro Pro, the spreadsheet, and the Paradox database manager. Quattro is a good, solid multi-sheet (up to 18,000 of them) system, and while it does have some odd little differences with Excel – formulae start with @ instead of =, for example – again, churning out charts and calculations proved simple. Paradox, which only comes with the Deluxe version of WPO, is a very powerful database manager that goes way beyond the usual 'CD catalogue' type applications and allows the creation of some powerful multi-database information banks. Linking, say, product, orders and customer databases is a doddle with Paradox's Visual Database Designer tool.

Presentations, on the other hand, was something of a let-down. It doesn't lack features – and, again, the live preview facility is a very useful addition – but changing on-slide elements proved clumsy and unresponsive, and slide playback didn't work properly at all. This may be a problem with the pre-release nature of the software but, even so, I'm not sure I'd like to have to use Presentations in earnest. It was also one of the slowest applications to start up, taking what seemed an eternity to configure its numerous templates and Wizards (or Experts, as WPO calls them).

But one duff application shouldn't spoil WPO's overall quality. It's not quite on a par with Microsoft Office, but it's certainly a strong competitor and packs all the features any office worker is likely to need. It has a good, professional finish (something you don't often get in the Linux world) and its fonts look surprisingly good (again, not one of Linux's strong points).

All in all, a very welcome addition to any Linux system's software library.

ApplixWare 4.4.2

ApplixWare is one of the older office products available for Linux, and its age shows. That's not to say it's looking past its prime, rather that it's showing the maturity of a product that's been often improved and enhanced.

That said, there are some signs that ApplixWare hasn't quite kept up with developments. Installation, for instance, is a little clumsy. You run ApplixWare within Linux's graphical user interface, so why does it have to be installed at the command line through a text-based installer? Whereas other suites are installed simply by inserting the CD into the computer's CD-ROM drive and clicking on an icon, with ApplixWare you have to exit from the GUI, mount the CD manually and run the appropriate script.

Once it's up and running, though, ApplixWare is good to use. The individual applications are accessed through a launcher window which also provides a central point for recording macros to automate tasks. Like other office packages, ApplixWare has a strong Microsoft Office look and feel, so its learning curve shouldn't be too steep for anyone who is moving over from Windows.

The basic package comprises competent word processing, spreadsheet, presentations, graphics, HTML page layout, database and email tools, but Applix also offers some very powerful, positively corporate-oriented database and application development modules as optional extras. The standard package also includes a Visual Basic-style programming system, SHELF.

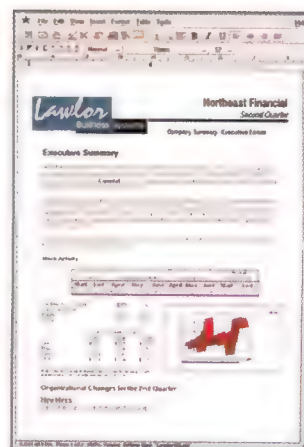
All the applications are competent – though not quite as feature-laden as Microsoft Office's equivalents – and I was able to get up and running very quickly with each. The drawing package, called simply Graphics, is of particular note. Graphics is a very powerful tool that combines both vector (drawing) and bitmap (painting) features and chucks in some surprisingly DTP-like facilities, such as the ability to wrap text round objects, into the mix.

With version 5.0 of ApplixWare just a little way down the line, bringing with it new features and better integration with Linux's KDE and Gnome desktop user interfaces,

ApplixWare

Right
ApplixWare's drawing package, Graphics, is remarkably sophisticated, providing not only complex line art facilities but photo editing features too.

Far right
Like most ApplixWare applications, its word processor isn't the most feature-crammed product available, but is sufficient to create any kind of document.



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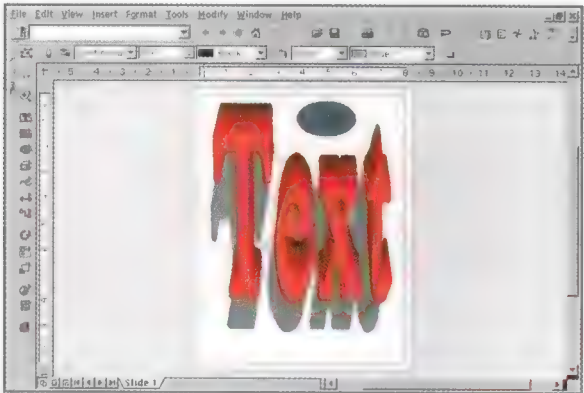
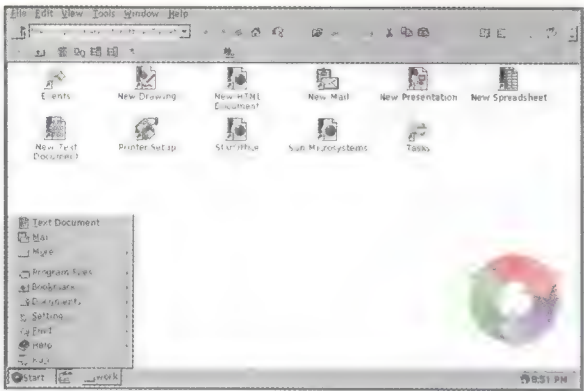
<http://www.xinit.co.uk>



StarOffice

Right
To make it easier to move over from Microsoft Office, StarOffice completely takes over the Linux desktop with a Windows 98-style interface of its own.

Below
StarOffice ships with a good drawing package containing a nice line in text manipulation tools.



ApplixWare is a powerful if little known office suite that's a strong alternative to WordPerfect Office and StarOffice.

Sun StarOffice 5.1

You get what you pay for, so the saying goes, and you certainly get your money's worth with StarOffice. StarOffice is free, and while it's not actually bad, it doesn't really feel like something you'd want to hand over money for.

StarOffice majors on integration, presenting all its applications through a single, common interface. The software presents you with a Windows 98-style desktop that is designed to replace your existing KDE or Gnome desktop. The idea here is that StarOffice will immediately be familiar to all those Microsoft Windows and Office users that Sun

hopes to entice away from Microsoft's clutches. And, indeed, all the applications make a good stab at mirroring their Office counterparts' look and feel.

And, it has to be said, StarOffice isn't that bad an Office replacement. It provides all the important components of an office suite – word processor, spreadsheet, graphics, presentation manager – and throws in a Web browser, email and news tools, a Web page creation program, and some personal information manager elements, such as a diary and a to-do list manager.

I found that all the components were competent at what they do and were able to get to work on a series of typical business documents without too much fuss.

But I kept returning to the clunky interface, which frankly feels messy and overly complex. Integrating all your applications through a single interface is fine, but you should allow users who only want to use maybe one or two applications to switch it off. StarOffice is pretty stable, but it still has an unfinished feel to it, rather like the early versions of Linux's own desktop software. And why include Internet applications when Linux already has them? Linux's own versions are better ones, too. Linux also does fonts better, but StarOffice only works with its own limited set of typefaces.

That said, it's hard to ignore StarOffice's price – or lack of one. And, for all its visual faults and quirky behaviour StarOffice remains a reasonably solid office productivity package that's powerful enough for almost all desktop users. Worth trying, but there are better alternatives.

Verdict

The release of WordPerfect Office 2000 and StarOffice are welcome additions to Linux, and with ApplixWare they make for a good selection of personal productivity tools. All office suites may offer near-identical lists of features, and while one may have a weaker spreadsheet module than the rest, it may have a much better word processor. That makes the final choice of which is the best package a highly subjective one. The bottom line is, any user will be able to get their work done with any one of these tools. Personally, I'd have to go with ApplixWare. For me, StarOffice was too idiosyncratic, WordPerfect Office too slow. But that's my choice – the point is there's now a choice to make.

FEATURES TABLE				
	WordPerfect Office 2000	StarOffice 5.1	ApplixWare Office 4.4.2	KOffice
Word Processor	•	•	•	•
Spreadsheet	•	•	•	•
Database	In Deluxe edition	•	•	•
Presentations	•	•	•	•
Drawing	Via Presentations	•	•	•
Photo Editor			Via Presentations	•
Equation Editor	•	Via WP	Via WP	•
Chart Editor	Via Spreadsheet	Via Spreadsheet	Via Spreadsheet	•
HTML Editor	Via WP	•	•	Via WP
PIM tools	•	•		Via KDE
Web Browser		•		Via KDE
Email		•	•	Via KDE
Macros/Programming	•	•		
Fonts	•	•	•	
Clip Art/Photos	•	•	•	
Price	£137.95	Free	£62	TBA

Note: Bullet points indicate the presence of a dedicated application or module. Where a feature is provided in a limited way by another application, that's noted as such.

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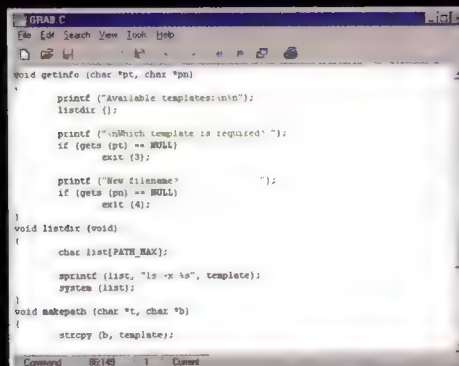
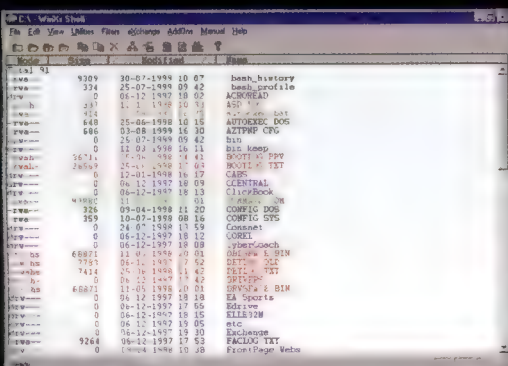
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WEB BROWSERS

Netscape 6 Preview Release 1

A promising advance look at what is arguably the most important application on the desktop

Pros	Fixes some loose ends in Mozilla
Cons	Still a hefty memory hogger
Price	Free download (around 6Mb) via the Netscape site

Looking back, it's hard to believe that the browser market has changed so much over the five years since Netscape first hit the scene with Navigator. I remember first using Netscape 1.0 and being impressed by the innovative feature set which was very different from what had been around previously.

Netscape enjoyed several years in poll position before Microsoft bought Mosaic from Spyglass and used it to create its own browser and source of controversy, Explorer. However, in the years since, Netscape has become quite popular amongst the UNIX community - some would say out of lack of choice - the browser itself hasn't undergone any fundamental change since its very earliest days.

To be blunt, Netscape has always been big, clumsy, bloated and also unstable at times. Communicator 4.72 has a standard memory usage of almost 19Mb for a single window, rising quite considerably when browsing through multiple windows. It is slow (on a PII-400 test system) and prone to random crashing - although that can often be attributed to running under the now standard libc6 libraries rather than libc5 that Netscape was originally designed for (use of the "compat-libs" is strongly recommended).

In January 1998, Netscape decided to release the source code to "Mozilla" - its Communicator browser under the "NPL" licence. The group named itself after the original Netscape code name - try viewing "about:mozilla" under Netscape. The original intention of the Mozilla group was to enhance and extend the existing Netscape source, but eventually it became clear that most of the code would have to be re-written to achieve the goal of a small, fast,

modular Web browser.

Mozilla offers advantages over Communicator 4 in the form of support for XML, themeability, HTTP compression, 14 platforms, CSS, and plug-in Java support. Until recently it lacked crypto support and it doesn't ship with a built-in Java VM for legal reasons. It sounds impressive, but Mozilla has yet to reach its goal of being small and fast, requiring around 70Mb RAM (in the M15 version), even for basic browsing. I'm assured that it will become much smaller as the development progresses - time will tell.

A short while ago, Netscape began to shape Mozilla into a commercial release that will become Netscape 6. NS6 will include features from Mozilla

as well as proprietary code licensed to Netscape such as Sun's Java VM - Java support is notable for its absence in the preview

All of the standard features that you would expect are in there - the browser, mail, news and HTML composer as well as "What's related", automatic URL completion and about a million other options that can be varied through its easy-to-use preferences. The recently re-written renderer is very fancy - although it doesn't refresh often enough. For development software, the browser is reasonably stable, and business users will find that such options as multiple mail accounts and extensive profile management are now standard and add to a very flexible client.

The results from the Mozilla project are so far very encouraging, as is Netscape 6. Bloat is nothing new in the browser market, although it would be better if it ran in under 30Mb. In the short term Netscape 6 creates a cohesive Mozilla. However, I think that ultimately Mozilla may win as the "pretty, fancy, configurable" browser of choice.

Jonathan C. Masters, Jonathan@easypenguin.co.uk

Contact www.netscape.com

NEW THIS ISSUE

NETWORK CARD

ALFA GFC2206

LINUX DISTRIBUTION

Dragon Linux v0.8

beta

WEB BROWSERS

Netscape 6 Preview

Release 1

NETWORK SERVICES

UK Linux Net

CROSS-PLATFORM UTILITIES

WinXs

SERVER HARDWARE

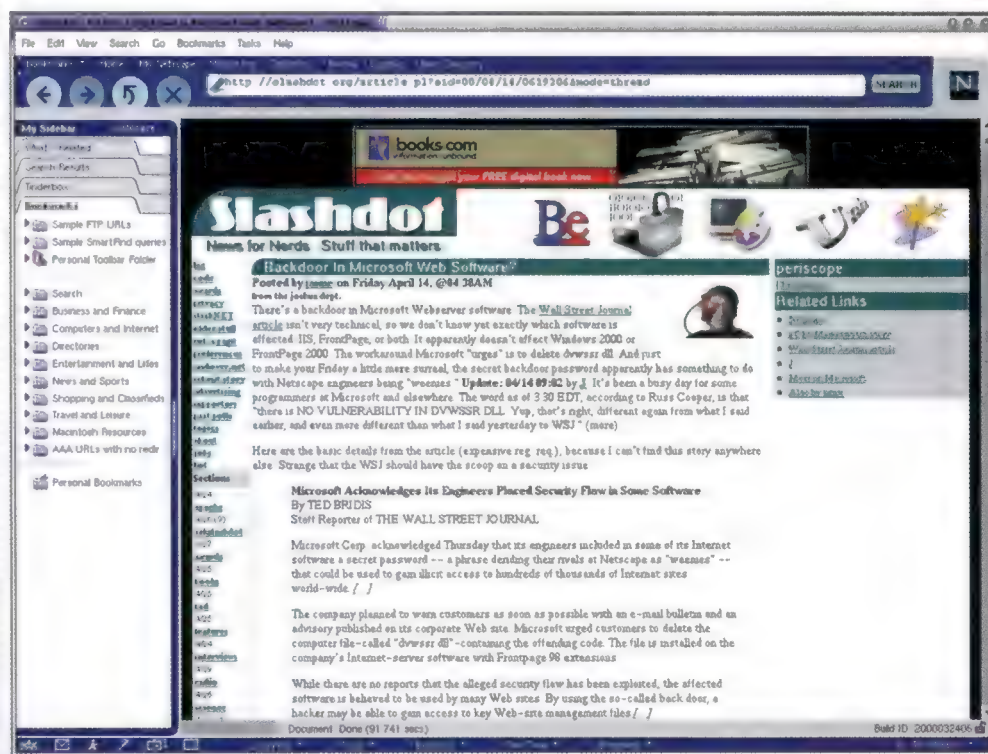
Xinit Webload 1100

LINUX DISTRIBUTION

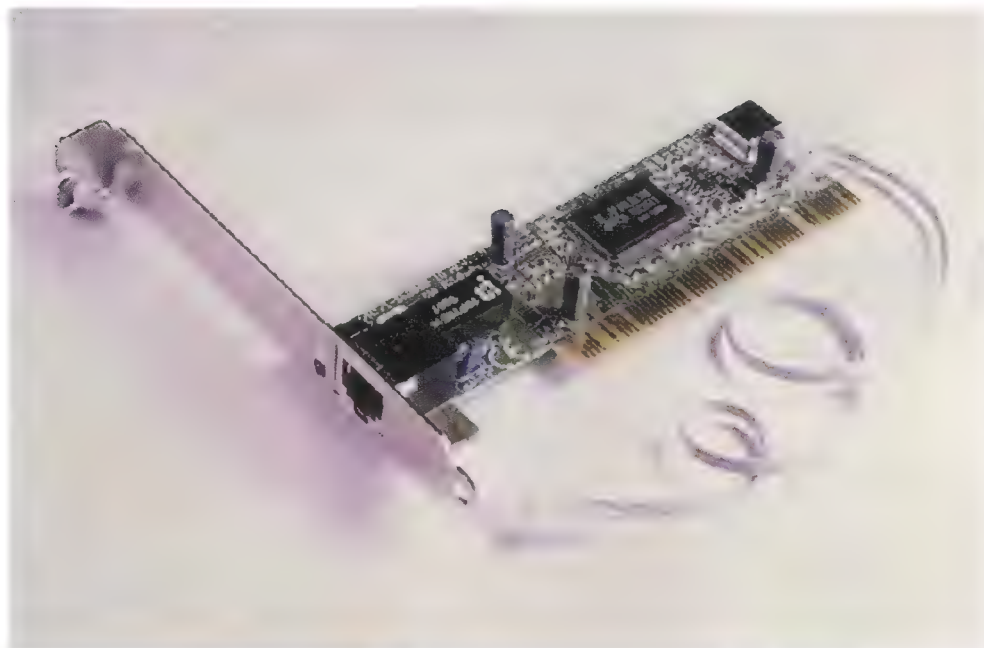
Yellow Dog Linux

Champion Server 1.2

Netscape's "wee-nies" have been busy dotting the 'i's and crossing the 't's on the work done by the Mozilla project



'To be blunt, Netscape has always been big, clumsy, bloated and also unstable at times.'



NETWORK CARD

ALFA GFC2206

Linux-supported budget 10/100 Ethernet card

Pros	Easy installation and good performance
Cons	No manual
Price	£12.77 (£15 inc VAT)

In previous experiences, I have found that price is almost directly proportional to hassle when dealing with network cards, so this card looks good already at a mere £15 retail.

Opening the box reveals just a card and a disk. No documentation – not even an installation leaflet, which makes this card unsuitable, perhaps, for beginners. However, installation was as straightforward as pushing the card into a vacant PCI slot and replacing the case.

This card is supported by Linux because of its chipset, the RealTek 8139. Red Hat should detect the card on installation, and other Linux distributions just need to have the relevant module loaded, or have their kernel configuration changed and recompiled. I have installed several of these cards in Linux machines, and several in machines running NT and Windows9x, without trouble. Performance-wise, in real world use, I cannot detect any difference between these cards and those of other manufacturers such as Intel.

In short, this is an excellent value card, especially for mixed platforms. If you need 20 cards, you can either choose to spend around £200 on ALFA, or closer to £1000 on a well-known name. I know where my money will be going.

Alex Bloor, ab@alexbloor.com

Contact Challinor International, 01753 687677

LINUX DISTRIBUTION

Dragon Linux v0.8 beta

A stripped-down Linux distribution masquerading as a Windows program

Pros	No-pain introduction to Linux for a Windows user
Cons	Still in beta
Price	Free download from; www.dragonlinux.org (CD available soon)

Even with all the current talk about Internet appliances and PDAs, and the work being done by major Linux distributions like Red Hat towards catering for these devices, choosing a distribution to suit more lightweight hardware, without the complexity of a system designed for a workstation or server, can be tricky.

For my elderly spare laptop I've chosen Dragon Linux – one of a breed of leaner distributions. Designed originally as a learning aid, it takes up a maximum of 150Mb and resides on an MS-DOS partition (cf. Phat Linux, Win-Linux2000 and Armed Linux). It's aimed directly at users, with as much simplification as possible, and has a small but supportive community.

The distribution is available as a single .zip file, and installs like any Windows application, even placing an uninstall icon on

the Windows start menu. Version 0.8 uses the UMSDOS file system, which has its limitations, but the imminent full release will use the loopback feature of Linux exclusively.

Based on Slackware 4, the base distribution is a 45Mb download in v.08, and will run in 8Mb of RAM including X and KDE. It achieves this by using TinyX, with the generic SVGA server that works on nearly any chipset and gives perfectly adequate graphics performance for simple tasks.

Dragon Linux is designed to be installed without configuration, to the extent that it doesn't even require a root password to be set. The mouse is assumed to be of the PS/2 type, which might cause confusion if it turns out to be the common serial mouse. Sound is not configured by default, no doubt due to the variety of different interfaces. Modules for obscure hardware such as the early proprietary CD-ROM drives are included, and are activated by uncommenting the relevant line in the file /etc/rc.d/rc.modules.

Optional packages can be installed from the Slackware ftp archive using the `installpkg` command. It's not as powerful or flexible as rpm, but it is at least straightforward. A noticeable improvement in speed is available by installing one of the more lightweight window managers, such as blackbox or icewm.

One handy feature of icewm on a Dragon Linux system is that unavailable programs are omitted from the right-click start menu – there's no room for the likes of Netscape Communicator on such a small distribution.

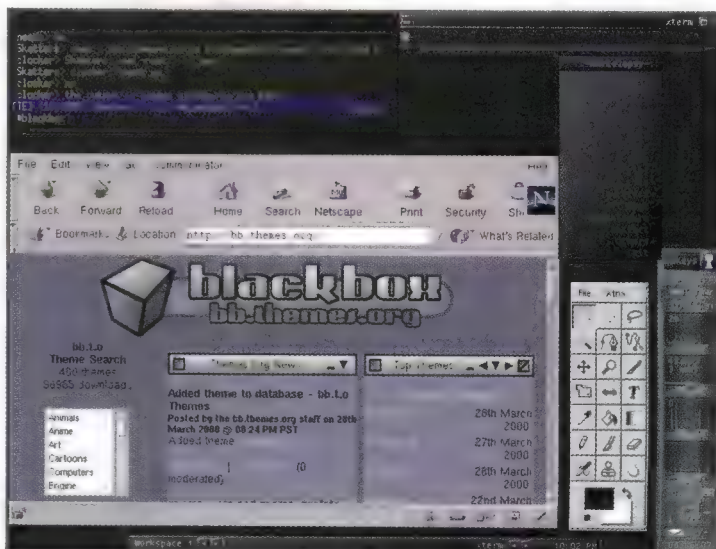
Instead you get text-mode essentials like lynx and pine, plus the KDE browser and kmail for those who can't do without a GUI. PPP is covered by the text-mode `pppsetup` and `kppp`. For a simple Web appliance, that might be all that's required.

Daniel James, daniel@linuxuser.co.uk

Contact www.dragonlinux.org

▲ Pick up a cheap desktop and with a supported chipset – like the RealTek 8139 – and you're into a winner with Linux.

▼ Dragon Linux runs on a 486, Pentium or even a 386. It's a great way to get started with Linux.



LINUX DISTRIBUTION

Yellow Dog Linux Champion Server 1.2

Version of Linux for servers, now updated for PC and Mac desktops

Pros	Bundles plenty of good software and has clever packaging
Cons	No graphical installer and FireWire support
Price	US\$24.95 (CDs only) to US\$99.95 (CDs, installation manual, 90 days support) direct from manufacturer (post and packaging extra)

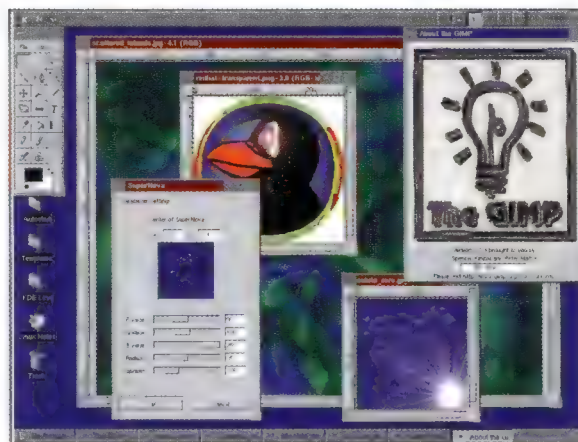
When Terra Soft Solutions shipped the first release of Champion Server just over a year ago, it was, as its name suggests, intended as a version of Linux solely for servers, be they Macs or other computers based on the PowerPC processor, such as IBM's RS/6000 line.

Version 1.0 was fine in that role, but it lacked some of the desktop-oriented features of other Linux distributions, limiting its use to anyone who wanted to focus on development work or just try out the open source OS on their Macintosh. Six months later, Terra Soft released version 1.1 adding some desktop software and upgrading the OS's main components, and now Champion Server 1.2 continues that trend, bringing it into a full server and workstation operating system.

Champion Server 1.2 is based on the standard PowerPC port of Red Hat Linux 6.2, and contains all of 6.2's key components. PowerPC and Intel versions of the Linux kernel are at different stages of development, largely thanks to the differences between PC and Mac hardware, and Champion Server ships with a stable beta release of the kernel called 2.2.15pre7.

So Champion Server's kernel supports both Universal Serial Bus (USB) and old Mac Apple Desktop Bus (ADB) mice and keyboards, older Macs' multiple SCSI buses, serial ports and graphics controllers, plus newer machines' ATAPI and ATA internal peripheral systems, and ATI Rage graphics cards. The only thing not supported, according to the manual, are the latest Macs' FireWire (aka IEEE 1394) ports, for external devices, but with these not yet commonplace, that's not an issue yet.

Champion Server ships with the standard text-based Red Hat installer rather than the new graphical version, but with the software's well-written manual, there were no difficulties installing the software. Configuration was straightforward and clearly explained too.



Yellow Dog brings Linux to some of the fastest architecture available - and it's now snapping at the Intel platform's heels

As server software, Champion Server is installed with networking including support for Apple's AppleTalk protocol Web, FTP and email services activated and ready for configuration. Terra Soft's manual, alas, doesn't extend to applications, so you're on your own here. Champion Server ships with database servers including MySQL and FrontBase, allowing you to build some powerful Web-based applications.

For workstation users, Champion Server includes the latest versions of Gnome and KDE. It also ships with many office productivity tools, such as AbiWord, but they're not sufficiently mature to be used in earnest so you'll just have to hope Corel ports WordPerfect Office over. That said, you can use the Mac-on-Linux emulator now bundled with Champion Server for the first time to run existing Mac office applications, but be prepared for a struggle to get it up and running.

So Champion Server isn't quite ready for the mainstream yet, but it is a powerful, standards-based server for basic Internet or internal small to medium-sized business use.

Tony Smith, tony.smith@theregister.co.uk

Contact Terra Soft Solutions,
presales@yellowdoglinux.com
Web www.yellowdoglinux.com/ydl_home.html

CROSS-PLATFORM UTILITIES

WinXs

Provides access to powerful, familiar UNIX-style tools if you have work on a Windows box

Pros	Well packaged and tightly integrated with the OS
Cons	You have to run Windows to use it
Price	£49.99 (£58.74 inc VAT) +P&P (includes 'lemmy', a Win32 version of 'vi'), direct from Advanced Electronic Publishing

Why's a Windows program being reviewed in a Linux magazine?

Well, even if you're solidly Linux/UNIX

by choice, sometime, somewhere circumstances may conspire to make you work on a Windows machine - Linus Torvalds himself has admitted to having one in his house. Alternatively, you might be a Windows user who just wants to have a little introduction to some of the powerful toolkit that has been available on the UNIX/Linux command line since the year dot.

Either way, if you have to do something more complicated than write a shopping list, you won't want to have to rely on stone-age utilities like Notepad and Find. You may want to display a file in hexadecimal format, or decode a unencoded email attachment that someone sent you. Perhaps you need to strip out some unruly carriage returns from a file that was written on a Windows machine. Or hone your regular expression technique to pinpoint the information you want from out of a huge mass of text.

There have long been freeware and shareware DOS utilities which mimic utilities that come as standard on serious operating systems. What's rather neat about WinXs, however, is that it presents you with a complete set of the tools you're likely to know and need. You can use the tools either in a window or at the GNU Bash shell, which is included in the package. Everything works fine, although there are some annoying DOS-style oddities on the command line, like having to type 'MORE.COM' where on Linux/UNIX you would simply use the command 'more'. Charmingly, it even keeps a .bash_history for you!

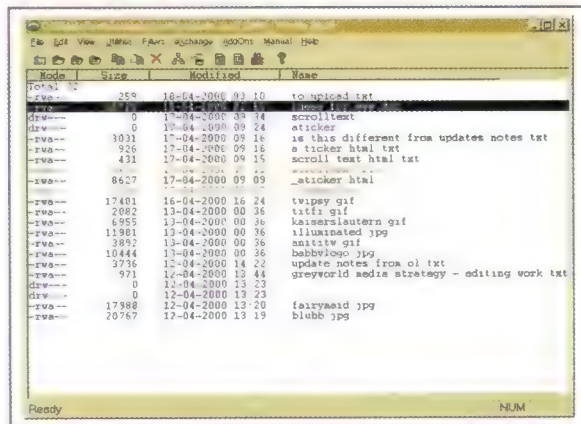
You can choose to integrate the WinXs shell with Windows Explorer, so you get access to the program from the right-click context menu.

WinXs does its job very well for UNIX/Linux users temporarily forced into using Windows, and it's hardly going to stop anyone from moving to Linux just because they have some handy UNIX-style commands at their disposal in their lovely MS GUI. Do with it what you will - it's a free country.

Trevor Parsons, trevor@linuxuser.co.uk

Contact Advanced Electronic Publishing,
0800 195 1115; Web www.aep.co.uk

New you can have...
Can't leave, but, finally,
get it all, all from
the safety of a
Windows box





SERVER HARDWARE

Xinit Webload 1100

High-specification 1U
slimline colo server

Pros	Compact, powerful, competitive
Cons	Some configuration issues
Price	£980 (£1151.50 inc VAT)

Space really is the final frontier in the ISP business. Once you've filled your datacentre with customers' machines, you're stuck and adding leased line capacity cannot save you. For this reason smaller machines specifically aimed at co-location have been appearing on the market for some time.

Cobalt has been popularised because of its friendly interfaces and easy-to-navigate control panels, which mean almost anyone with some basic knowledge of the Internet can appear to be a hosting company. Fewer machines have been marketed in this size for those who do not need or want a jazzed-up Web interface for control. For people who are familiar with Linux, flowery Web interfaces are pointless, and can actually slow things down. This is the market UK Linux hardware specialist Xinit is clearly aiming at.

Installed with Red Hat 6.2, it was pleasing to see that patches from the Red Hat errata page had been pre-installed. This is important for the security of the box and would save time for anyone with several of these servers to manage.

The machine has everything that a standard PC server would have – floppy and CD-ROM drives as well as the usual array of ports – video, serial and parallel. 10/100 networking is included on-board. Some problems were found with the Ethernet interface; the machine had a tendency to hang at the eth0 initialisation stage after being rebooted. Xinit explained that this was a known problem and would be fixed by the time you read this. There are micro-phone, line-in and line-out connections, but running `sndconfig` revealed that the card was unsupported, however. USB

▲ UK Linux hardware specialists Xinit are aiming to give Cobalt a run for their money with the well-priced Webload 1100

connectors are present but are also unlikely to be used.

The machine's performance was pleasing. 128Mb of RAM should mean that for standard Web, mail & DNS serving, swapping to disk should be a rare occurrence, and the 500MHz Pentium III should keep the server responsive, even when many processes (such as compiling) are running at once.

One very slight issue which was surprising was that the server's Phoenix BIOS was configured to stop on all errors. This effectively meant that as soon as the keyboard was disconnected, and the machine rebooted, it stopped on boot. Since the intended location of this machine is in a rack with many others, it would not normally have a keyboard connected. If you leave this BIOS setting as it is, boot the machine with a keyboard, then disconnect it live, you will have a nasty surprise if you ever have a power failure or try to reboot remotely – it won't come back up!

Although not for Linux newbies, the machine is quick, well constructed and secure, and that's all that matters with a machine you are planning to co-locate.

Alex Bloor, ab@alexkbloor.com

Contact Xinit, 020 7247 4761
Web www.xinit.co.uk

NETWORK SERVICES

UK Linux Net

Good Linux dial-up with
excellent free Web space

Pros	0845 revenues support free software development
Cons	Your phone provider still profits
Price	Free to join and use

UK Linux Net is a dedicated Linux ISP, set up by Definite Software, the maker of the Definite Linux distribution. It offers dial-up services and Web hosting on the by now familiar 'free' model where the ISP generates its income from a percentage of your call charge from BT. The limitation of this model for heavy users is that call charges have to remain relatively high in order to allow sufficient

margin for both BT and your ISP. Technical support over the phone is usually on a premium rate line, priced at around 50p per minute.

A challenge to the model comes from companies which supply both voice and data calls at lower prices than BT, such as OneTel, which has recently dropped its Internet access price to 1p per minute including VAT, around a third of the price of 'free' ISPs during office hours. To survive, the ISPs are going to have to offer services that the phone companies cannot.

UK Linux Net has an average service as far as dial-up access is concerned. Connection speeds with a V.90 modem were around 49K, with the occasional drop in speed to 33K, never going below 28K. The connection rarely dropped without warning, but there were a few duff connections where no packets went in either direction. As with all 'free' ISPs, there were sometimes problems getting a modem to answer the call in the evenings, when the off-peak call rate of around 1p per minute attracts Britons on-line. ISDN access up to 128K is also available.

So what can UK Linux Net offer? Firstly, the ISP has been set up to fund free software projects. So far this means some GPL'd patches to the Cistron RADIUS server, but when the ISP starts generating a surplus, a fund will be set up that developers can apply to.

Secondly, it offers perhaps the best free Web hosting facilities available. Each account has 20Mb of Web space with full CGI and PHP access, and you can set up your own .htaccess and .htusers files. MySQL and PostgreSQL databases are also available. Unfortunately, domain name registrations and the DNS hosting required for them are not on offer yet, although they should be soon.

Planned improvements include a fax and voice-to-email gateway and a simple front-end for database maintenance. More Linux content is being developed for the site by a team of volunteers, and a local Linuxberg mirror has recently been added.

Phone-based technical support is not available – this is unlikely to be a problem for Linux users. In any case, phone support is expensive to provide, and by not offering it at all, costs can be reduced all round. Free support is available via email, usenet and the UK Linux Net Web site.

UK Linux Net is a well-intentioned project that deserves to succeed. For the Linux user who requires advanced Web site features and does most of their dial-up at off peak times, it's ideal. However, business users may be swayed by the lower peak-time call costs of the new phone companies.

Daniel James, daniel@linuxuser.co.uk

Contact www.uklinux.net

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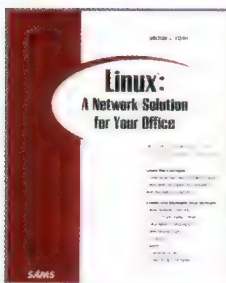
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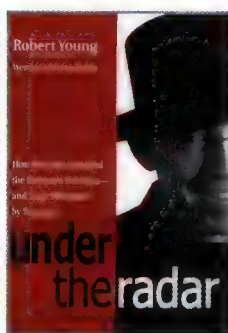
Linux: a Network Solution for Your Office

Author: Viktor R. Toth
Publisher: SAMS
ISBN: 0672316285
Price: £31.50
(£28.35 Computer Manuals)
Reviewer: Martin Howse

"Linux: a network solution for your office" covers system installation (bundling Caldera OpenLinux on CD with the book) and what are now standard areas – firewalls, routing, Web server, mail, DNS and, finally, system administration and tools.

Given some basic network experience, anyone working through this book should be able to drag an old 486 out of the storeroom and get it up and running as a solid and useful network system with just these tools. It achieves this reasonably well and provides a thorough grounding in networking with Linux, though it does lack the focus and interest of real-world examples and problems and could benefit from a tutorial structure.

Given its purposes, including an old (1998) distribution is fine, but beginners would probably be happier with a current distribution which would include a good manual and further essential documentation on CD.

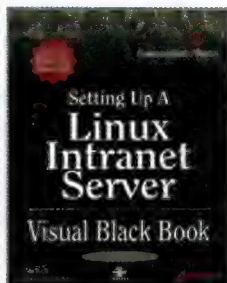


Under the Radar

Author: Robert Young and Wendy Goldman Rohm
Publisher: Coriolis
ISBN: 1576105067
Price: £17.99
Reviewer: Martin Howse

This is the dynamic story of the rise of Red Hat and of a new business model: free software. Much of the meat of this book comes from the passion and interest inherent in this vital history and the important issues which it raises for business in a new era. The anecdotal narrative gives context to the massive growth of the free software/open source movement, illuminating key personalities and recounting David-and-Goliath struggles with large corporations and their problems adjusting to the new model.

It tells how Linux grew as a child of the Internet and quickly went on to contribute enormously to its growth; presenting the new paradigm of a co-operatively built group of integrated networks with no one company in control. The implications for business are made plain throughout this compelling book, but one cannot fail to see some irony in Red Hat's ambition to become the Heinz ketchup of the Linux world!

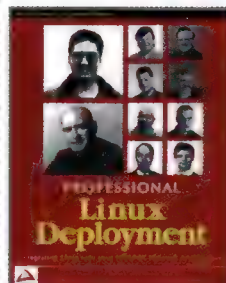


Setting up a Linux Intranet Server - Visual Black Book

Author: Hide Tsuji and Takashi Watanabe
Publisher: Coriolis
ISBN: 1576105687
Price: £17.49
Reviewer: Martin Howse

This is a beautifully styled step-by-step guide to building a local area network from scratch. It covers both the necessary hardware installation and software required to set up a Linux machine as file, mail, Web and print server at the centre of a Windows/Mac intranet. Its simple, graphic visual style manages to dispense with jargon and takes the fear out of using the command prompt. In a slim volume it covers Sendmail, Apache and Samba as well as general system administration. Unusually, the book also devotes space to Netatalk, which enables Linux to serve files to Macs.

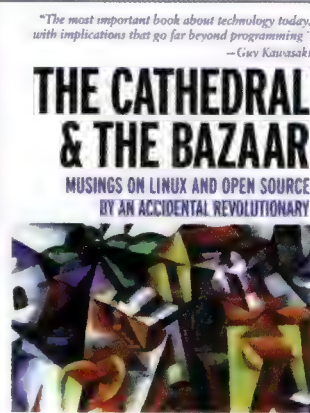
This guide is aimed squarely at the absolute beginner, both to Linux and networking. The basic concepts are communicated clearly and with confidence, and it is a pleasure to guide oneself through its visual step-by-step style.



Linux: Professional Linux Deployment

Author: Prasad, G et al
Publisher: Wrox
ISBN: 1861002874
Price: £35.99
(£30.59 Computer Manuals)
Reviewer: Martin Howse

"Professional Linux Deployment" is a heavyweight work giving a detailed and thorough grounding in Linux and its exciting possibilities for the more technically minded IT professional. As a whole, it presents a passionate case for the use of Linux in enterprise, providing the knowledge base and confidence to deal with real situations and contemporary business problems. With numerous case studies and well-researched links to further materials, it covers all the important areas (including database deployment, e-commerce, the Linux DCOM environment and cryptography) as well as more current, bleeding edge technologies such as distributed systems. The balance of real-world examples for enterprise with tutorial and command line material make this book an exciting read and a spur to getting more out of Linux; integrating its philosophy and passion with real business deployment.



The Cathedral & the Bazaar

Author: Eric S. Raymond
Publisher: O'Reilly
ISBN: 1565927249
Price: £12.95 (£11.65 from Computer Manuals)
Reviewer: Douglas Carnall

If Linux were Windows then Eric Raymond would be Microsoft's Director of Marketing. But Linux is not Windows and ESR is no corporate suit. He is a fully-fledged hacker, and project leader for fetchmail - a widely used mail retrieval utility.

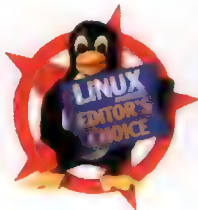
This is a cultural explanation of open source, showing how the hubbub of co-operative software development offers unparalleled quality assurance with which even the most splendidly constructed corporations cannot compete. As Raymond says: 'Given enough eyeballs, all bugs are shallow.' This, together with the chance to avoid the inevitable political problems associated with proprietary software-forced "upgrades", exploitative pricing, and user helplessness in the face of system incompatibility makes open source a sure long-term winner.

Raymond's essays are freely available from his Web site, so why buy the book? Well, you can read it in the bath, for starters, and lend it to friends who don't yet "get" the open source idea. And when intellectual work is as influential as this, it's good to lay your hands on a definitive, stable version.

Definite Linux

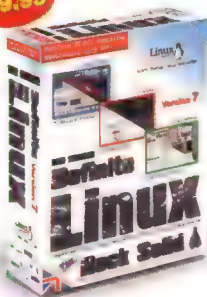
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...Linux Format, May 2000



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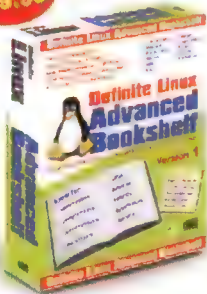
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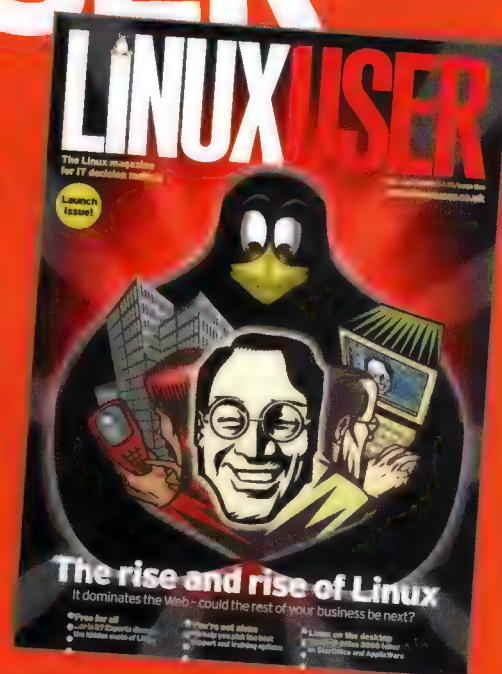
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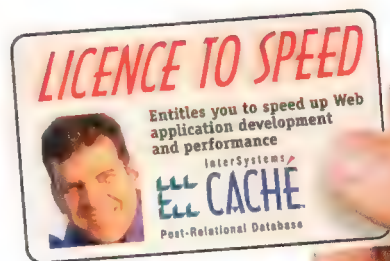
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At your service

Linux and thin clients are a winning combination. Simon Brock explains why



You turn to the screen at your desk – or at your elbow – and everything you need is there: a keyboard, a mouse, a microphone, and a smart card reader maybe. But isn't something missing? Unlike a PC, there's no bulky box cluttering up your desktop, no heat or high-pitched noise from disks and fans... and nothing much to go wrong.

What you are left with is seamless access to your data, to the applications you need to use, and to the rest of the world. Gone is the need to worry about backups, software upgrades and the other tedious tasks of computing – leave that, like everything else, to the server and its administrator. Sounds attractive? Welcome to the world of thin clients – where Linux feels at home.

What goes around...

Although thin is definitely back in, the idea of slender clients depending on a powerful central computer certainly isn't new. You can trace it back to the early multi-access systems of the 1960s. Many 1970s mainframe

systems used 'smart terminals', capable of very simple processing, but it was the rise of Unix in the mid-80s that brought us what we know as client-server computing and, in particular, diskless workstations.

Diskless? How does that work?

Early workstations were self-standing machines with their own processors, screens and costly disks. When file servers were created, connected to the workstations via 10Mb Ethernet, someone saw the sense in taking the disks out of the workstation and having it download its operating system at startup from the server. Designers soon realised they could also use this model to implement virtual memory by swapping to a remote disk on the server. Hey presto, the diskless workstation was born – the first real thin client.

X hits the spot

So the disk was gone, but if you wanted to use a graphical application, it still had to execute on the local work-

station. To the rescue came the X Window System – the protocol that still provides the GUI for Linux. X splits the job into two processes: the 'X client' implements the application (a word processor, say) while the 'X server' draws the information on the screen. The beauty is that each process can run on a separate machine. Thanks to X, all you needed was a terminal that implemented an X server. A thinner client, and more cost savings. And you can access your X session from any machine on the network.

Where do network computers fit in?

Network computers (NCs) come somewhere between diskless workstations and X terminals. The Java-based NC was designed to be cheap like a display terminal but still capable of running applications locally, on a very simple underlying operating system and hardware. The capability of NCs vary from those which are just X Windows terminals with Netscape built in, to devices which are complete Java machines running JavaOS.

But PCs are so cheap and powerful today – why use thin clients?

Total cost of ownership, largely. Thin clients are much simpler to manage than disked machines. They can all run the same version of the operating system, booting from the same image. The applications they use can be controlled at the server and the files they use stored there, guaranteeing proper backups. A PC may look like more bang for your buck, but a thin client model can save you large amounts of money if you're deploying multiple machines. Savings of 40 per cent are commonly quoted, while Linbox, for example, claims that their open source network architecture costs 75 per cent less than traditional client-server solutions based on

Thin Clients

Windows 98 Windows NT and 60 per cent less than thin clients solutions based on Citrix/ICA.

Why is Linux so good at managing thin clients?

Consider the life cycle of a thin client machine. When it is turned on, it tries to find an IP address by broadcasting on its Ethernet port using BOOTP or DHCP, and then downloads an operating system startup – usually via the Trivial FTP IP service from a tftpd daemon. These are all services that a Linux machine supports by default.

This much is true of virtually all thin client machines whether they are just display terminals or diskless workstations. If Linux is downloaded to a diskless workstation, the Linux kernel can use Networked File System (NFS) to access all the other resources it needs. It may also use other services such as the Network Information Service (NIS) to find out user names, host names and so on, or the X Window System font server to find fonts to display on the screen.

Sounds worth experimenting with.

Well, first of all you need to create a cut-down Linux kernel which only contains those facilities which are required by the thin client. This may require some re-compilation, although recent modular kernels are quite small. You also need to create a Linux installation where as much as possible of the file system can be mounted by the workstation read-only so it can be shared by a number of workstations. This is reasonably easy with modern versions of Linux as most of the file system outside of /var – as in 'varying' – is read-only.

The Linux Terminal Server Project (see *Slimming Tips for Penguins*, box this page), is an open source project to create the administration tools to help with setting up diskless workstations that boot from a network server. For a well featured alternative, check out www.linbox.com for details of the Linbox Network Architecture project, developed in co-operation with SuSE and MandrakeSoft.

sions of Linux in their desktop devices.

The current market leaders in thin clients are NCD, Wyse, and Tektronix, while HP, IBM, Sun, and Compaq all have offerings running embedded Linux. HP's Entria X, for instance, is a browser-based thin client set up to deliver access to applications – whether Web-based or based on UNIX, AS/400, or NT – within heterogeneous environments.

Other companies are now building their whole offering around the Linux desktop device market. Maxspeed – who are convinced that for Linux to win, it has to win on the desktop – makes ultra-thin clients that will attach to any monitor, keyboard and mouse and hook to the Internet via a Linux server.

What thinnovations are in the pipeline?

The place of thin clients in single-function terminals like airport check-in, hotel front desks, and warehouses is well established, but much of the current resurgence of interest in thin clients is in the application service provider (ASP) model, where office workers, say, access applications on geographically distant servers.

Sun – who compares the habit of maintaining data and applications in-house to keeping your money in your mattress – have created much interest with StarOffice Portal, which will offer business users Java-based apps and personalised 'Webtops'.

Corel, another big backer of Linux, is pursuing the potential of thin-client 'information appliances' through its affiliation with OE/ONE.com, and is also aiming to ease the migration to Linux with delivery of Windows applications to Linux desktops – fat or thin – via GraphOn Bridges.

The ASP model shows particular promise for highly specialised applications – like Pinnacle Internet's plan to build end-to-end Linux-based point-of-sale solutions delivered over the Internet as an ASP service – and for services such as accountancy, payroll, and human resources which leverage professional backup.

Whether you're a small enterprise wanting to concentrate on your core competency by fulfilling routine business functions via an ASP, a larger firm wanting to make your infrastructure more platform independent by adopting ASP-style solutions internally, or an user who wants to have the simplest interface possible, thin clients and Linux could have the answer.

VNC gives you Linux anywhere

Check out www.workspot.com to sign up for your very own Linux X desktop that you can pick up through a web browser anywhere. To display your remote desktop on your screen, your browser uses the Java version of a very nifty program called VNC (Virtual Network Computing). The VNC project was set up by the Olivetti & Oracle Research Laboratory in Cambridge – now AT&T Research UK. The original idea was to produce a thin client device based on an LCD display with a stylus – a tile or slab system. VNC produced thin client software to reproduce on one machine the display running on another. As the protocol was very simple, the program running on the display could be very simple.

Although the device itself has disappeared, the client has been ported to many operating systems – including all flavours of Windows, Unixes, MacOS, AmigaOS and the Java version in a Web browser you can use to access Workspot, and there are servers for Unixes, Windows and Macs. This means that, with a single program, a user on one machine can access desktops on other machines. For example, if I have a Macintosh on my desk, I can access UNIX, Windows or other Mac desktops very simply. All the programs run on the remote machine, they just display on my machine. If you need this style of system then VNC is excellent and free! Pick up VNC today from: www.uk.research.att.com/vnc

Where do I get a thin client?

An economical alternative to buying thin clients is to turn previous generation PCs into diskless X workstations by removing the disk drive and giving them some boot code – usually contained on an eeprom attached to the network card. Companies like disklessworkstations.com can provide suitable hardware. Alternatively, the Etherboot home page (see *Slimming Tips for Penguins*) will show you how to build one yourself.

If you've got the budget to go for ready-made, there's no shortage of companies offering thin client products, ranging from the dumbest display terminals to NCs supporting a rich set of protocols to access data and applications across a diversity of platforms. Increasing numbers of manufacturers are choosing to use stripped-down ver-

Slimming tips for penguins

Diskless-HOWTO

This document, available from the Linux Documentation website and included with most Linux distributions (in /usr/doc), explains how Linux supports diskless workstations. Although aimed mostly at people using the Slackware Linux distribution, it gives a good overview. Also, read the appropriate manual pages such as bootpd, dhcpcd and nfs.

Linux Terminal Server Project

Open source project to provide extra support to Linux for diskless workstations.

DisklessWorkstations.com

A commercial site selling diskless Linux workstations.

Etherboot home page

The project that helped the authors get network booting working for Linux-based thin clients.

The Unpaid Bill

Read all about how the Department of English at the University of Georgia replaced MS Windows with Linux thin clients

Companies selling thin clients

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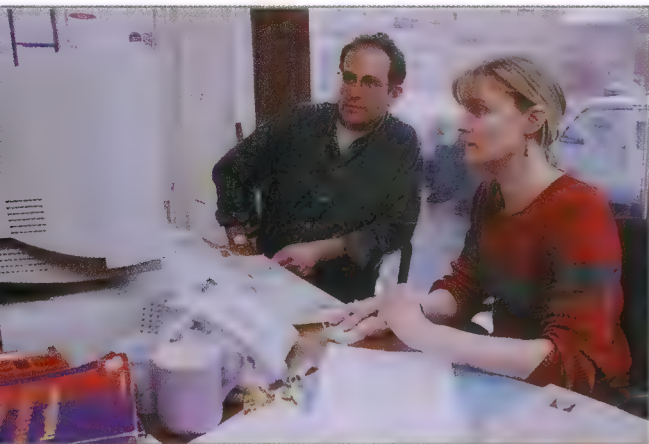
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John showing an advice worker how to log onto the new network. 'The new system is designed to require the minimum of retraining for workers,' he says.



Ash's config tips:

'You really need to configure the disk in a way that reflects the way in which that organisation conducts itself. Is it going to have lots of applications running on a server, or leave all its mail in a vast pool, as generally happens?

'I find that default configurations are optimised for having a lot of programs running on the server, and for having well-behaved users. Invariably, users are not sensible or sensibly controlled, so you need lots of space where they can misbehave without causing problems. On the other hand, if you're pushed for time, there are releases of Linux like e-smith, which are based on Red Hat and do a very adequate small office-style configuration of the box for you. It's a great solution if you haven't got the time or money to spend on a bespoke config. As well as Samba, it also does Netatalk, so you can share files transparently between Macs and PCs.'



server and getting all the workstations to use content cached from the Web.' Linux gives you the equally effective option of dusting off an old 486 out of the cupboard, putting in a floppy disk loaded up with an image of FREESCO or the Linux Router Project, but Ashley is opting for the hard-wired solution in this case.

'Personally, I just find it faster and easier with a router. It's absolutely fine, of course, if a little arcane, to do it on a PC. The important thing is to make sure everything's compartmentalised, so that if the server goes down, the workstations can still have access to the net.

'For the same reason,' he continues, 'I always do two routes into the print server - one via SMB, and one straight through. SMB manages a queue on that print server, and with Samba I can also provide printer drivers on the Samba server, so they just click an icon, and it will then load the drivers into the Windows workstation.'

CAB workers will each be having separate email addresses, mail for which will be stored in the ISP's POP mailbox until the server retrieves it. 'We use IMAP on the server,' says Ash, 'because it's a fully-featured centrally-managed server-side implementation. It allows you to have folders, as well as a shared address book, on the server. You can log in from anywhere, and use it as your central base.'

The choice of IMAP offers interesting possibilities for the future, too, with diverse methods of access and manipulation on offer such as the PHP-based Web front end Imp which allows users to access and manipulate their mail over a secure link. 'That's right,' says Ash. 'You can do an amazing amount with it.' All email for the CAB's domain is spooled by their ISP in a single POP3 mailbox

with the various recipients' names written into an extra header: "X-Envelope-To". 'It's the standard header problem when you move SMTP mail into a POP mailbox,' explains Ash, 'because you're using a protocol that's not really designed for what you're doing. So we get around that by using Fetchmail, which can collect for multiple users from one POP mailbox. It looks for the recipient in the X header and puts it in the right local IMAP mailbox accordingly.'

Outgoing mail is handled by Sendmail, with email masquerading enabled so that all mail has the correct domain name going out, and the server is set to connect and retrieve mail from the ISP at regular intervals. Ashley also provides a run button on an internal Web page to allow CAB workers to collect and send mail whenever they like outside of the regular connections.

'That's one of the reasons I always like having the Web server running on the internal server,' he says, 'so I can set up PHP scripts like that for them to run from an admin page. I don't want to be there to push buttons.' The Leytonstone CAB network will be ready to benefit from nailed-up access as soon as the new connectivity options come on stream. Ashley is rather looking forward to it. 'The moment SurfTime and DSL connections are available I'll stop putting in ISDN,' he says. 'And the beauty of it is, I'll just be able to manage the server through the Internet.'

John has returned from his workstation tweaking, and Ashley takes the opportunity to have a little dig about the choice of equipment. 'I must put it on the record that I don't like that printer,' he laughs. 'It's an Epson. Couldn't you have stretched to an HP? I much prefer them.' John shrugs and mentions the 'B' word. But in reality a cheap non-PostScript printer isn't too much of a problem, since Linux distributions all come with excellent print filters as standard. 'The free Ghostscript utility effectively turns your stupid Dimension printer into a PostScript printer, and it's very easy to configure as well, now that the Red Hat print-tool utility is well advanced.' Yet another case of Linux providing excellent functionality at a fraction of the cost of closed, proprietary solutions.

John Pipal concurs: 'By installing a Linux server you're setting up all the services your client is likely to want in a very efficient way. Not only that, but you're avoiding lock-in, too.'

And perhaps most important of all, Linux's configurable modularity allows plenty of flexibility for adapting to the changing needs - which will be important for an organisation changing the way it works as quickly as the CAB. All in all, it looks as if the advisors got themselves some sound advice here.

'It doesn't really bother me what goes on in the back end - or what operating system it's running - as long as it works!'

**Andy Munton,
Manager,
Leytonstone CAB**

Links

www.samba.org	Samba provides a complete replacement for Windows NT, Warp, NFS or Netware servers
www.nacab.org.uk	National Association of Citizens Advice Bureaux
www.pipal.net	Pipal Associates
www.freesco.org	FREESCO, free replacement for commercial routers
www.linuxrouter.org	the Linux Router Project
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www.fetchmail.org	remote-mail retrieval and forwarding utility
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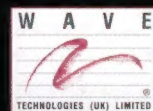
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Most of my time is spent writing and teaching about law for the Internet society, or proposing and helping to implement legal strategy for the free software movement. Linux users know that free software, because of the way it's made, achieves levels of quality that proprietary software rarely meets, and delivers reliable cutting-edge technology at a price every individual user and business can afford. But from where I sit, free software is also central to the biggest legal and political issues that the global Internet society will face in the next 25 years.

We often discuss "the Internet" as though it were either a thing or a place, but we do better at grasping the legal and political issues the net presents if we think of "the Internet" as the name of a social condition: the fact that everyone living in the networked portions of the world can now communicate with anyone else directly, without intermediaries, reaching very large numbers of people at almost no cost. A society in which everyone is connected to everyone else behaves differently from any society that has ever existed before; past "principles" of social and economic law, things that seemed always true everywhere, aren't anymore.

Free software – like the Linux kernel, GNU Emacs, LaTeX, Apache, Perl, and all the other excellent tools freely available for you to use – exists because in this pervasively interconnected society, non-traditional means of production can be amazingly efficient. Large numbers of programmers can collaborate easily on enormous projects without having to be locked into a hierarchical organisation. Everyone can participate in finding and fixing bugs and everyone can readily incorporate all the fixes, so the quality of free software can be much higher than that of programs produced by a limited number of developers and testers inside a commercial proprietary manufacturer.

At first glance, free software seems to pose a problem mostly for commercial proprietary software firms. And it is a problem for them: they're going to have to learn to compete against excellent products that everyone can copy, use, improve and redistribute at no cost. But there are more serious forms of confrontation ahead.

Instead of thinking of the net as a place called "cyberspace", think of it for a moment as a collection of pipes and switches. Information flows through all the different kinds of pipes, and is modified or sent to particular destinations by the switches. The

Who controls the switches?

'A society in which everyone is connected to everyone else behaves differently from any society that has ever existed before'

switches determine who gets what information, how privately or publicly, and what – if anything – users downstream from the switch have to pay to receive the information. For you, the most important switch of all is the one closest to your eyeball and eardrum. It shows you the text and video you ask for, plays your music, carries your voice calls and video conferences, and so on.

But there are other people too who want to control the switches nearest you. They want to be able to deliver music or movies, for example, that you have to pay for each time you listen or

watch. Copyright law protects them already, by making it illegal for you to copy music or movies and give those copies to other people. But in the world of the net, where copies cost nothing and move everywhere instantly, the distributors of proprietary media think

that legal protection is not enough. They want to be sure that your computer can't make copies of the music they've just delivered to you over the net. In the phrase of Professor Larry Lessig of Harvard University, they want code to substitute for law.

In the world of proprietary software, the user doesn't control the switch he himself owns: the software manufacturer does. If Microsoft makes the Windows Media player so that there's no way to save streaming audio on the hard drive, it's almost impossible for the user to unmake that decision.

But free software is code that any user can change, and therefore it can't be used to substitute for law. And because free software often replaces proprietary software, it can act subversively, to undo "laws" made by proprietary programs. Free software browsers can remove the ads from Web pages, a free software DVD player can let you fast-forward through commercials. Any free software media player could be modified to save the music or video it is playing. "Who controls the switches?" That's the most important legal and political question in the Internet society. Free software says that, as individuals and as organisations, we do. So sometimes "code is law" and sometimes code is freedom. Which makes for many complex legal issues, a few already raised in the courts and many more that we'll see in the next year or two, as free software finds itself at the center of conflict over the politics of the net.

Eben Moglen is professor of law and legal history at Columbia University Law School in New York. He has designed and implemented programming languages at IBM, served as law clerk to Justice Thurgood Marshall of the United States Supreme Court, and serves without fee as General Counsel of the Free Software Foundation. He is presently advising the Electronic Frontier Foundation on its legal activities in defense of free software DVD players. You can read more of his writing at <http://moglen.law.columbia.edu>.

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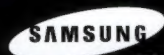
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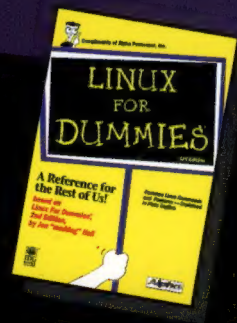
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